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Hellenism in North-West India.

By COLONEL D. H. GORDON.

(Communicated by Dr. B. S. Guha.)

It is unlikely that this article will solve any of the riddles of Indian Hellenism, nor has it been written with that intention, but it may contribute something to a fuller understanding of the issues involved and present a wider range of material evidence than has as yet been assembled. Some of this evidence has been included in the chapter on Hellenistic Terracottas in a Memoir on Early Indian Terracottas compiled by the writer for the Archaeological Survey of India, the issue of which has unfortunately been postponed indefinitely by the paper shortage.

Enquiry into the extent that Indian art is laid under contribution to Greek art has for the most part been so clouded by national and political bias that the wood has been obscured by the trees of controversy, often on matters so trivial as to be unworthy of consideration except as debating points. Without plunging profitlessly into the morass of the art controversy, which has raged intermittently in India during the last thirty years or more, as to the extent which Indian art may borrow from the West and not lose its essential characteristics, it may be urged that the elements of this controversy apply with equal force and cogency to Western influence during the early historic period, from the time of the eclipse of the Mauryas to the end of the Gupta dynasty.

Western influence is unfortunately only too often mixed up with Western taste, and some Indian art purists go so far as to eliminate from their works items of sculpture which experience has shown make the greatest appeal to that taste. In this there are faults on both sides, as what could be more irritating than for a European to praise a particular figure with the words—‘I like such and such a sculpture, it isn’t a bit Indian looking’. It may not be so typically Indian as, in the mind of the observer, many others, but at the same time it is Indian, and owes little if anything to European art influence. In art, though they may be more rare in Nature, the modern, more particularly the modern European, likes his women to have long legs, even disproportionately so. The figures in the triptych shrine of the River Goddesses in the Kailas Temple at Ellora have nice long legs, as also have an attendant on the River Goddess at Dumar Lena. In consequence most volumes by the Indian purists do not show these attractive ladies. In

the same way the admirable Shiva and Parvati shaken by Ravana, the attractive though somewhat sentimental Sālabhanjikā,¹ and the 'Rukhmini' of Nokhas² might easily disappear as being too suspect for retention as purely Indian.

First of all it will be as well for us to examine the extent of Hellenistic influence, and then attempt to determine from what sources this influence derives. Tarn, who though no doubt an excellent Greek historian is a most indifferent archaeologist, speaks of the art of the Indo-Greeks for themselves and cites certain well-known art objects from North-West India.³ Whether there was in fact any art of the Greeks for themselves in India is a matter which needs closer examination. It will be as well to remember that relatively little of the original sculpture of the golden age in Greece has survived. Of free-standing statues nearly all we have are copies made in Hellenistic and Imperial Roman times, and popular pieces were copied over and over again. It is only those sculptures of which we have literary descriptions that can be ascribed with any real degree of certainty as being copies of a famous statue by one of the great masters. As for the others, art critics and historians see in certain pieces the revealing touches which indicate the master hand that executed the original. Unfortunately opinion on these matters is far from unanimous, and, while one appreciates that there is controversy on such points, it is distinctly shaking to find that so famous a statue as the Aphrodite of Cyrene is ascribed by so eminent an art critic as Roger Fry to the fifth century B.C.,⁴ while an equally eminent classical archaeologist, A. W. Lawrence, dates it to late second or early first century B.C.⁵ The Aphrodite may be a copy of an earlier piece, and the disparagement usual to creations of the Hellenistic period no doubt favours this, but there is no evidence for it. The same discrepancy may be found in the torso of Nike which Fry ascribed to the same circle as the work of the Parthenon, but Lawrence to possibly the Monument of Euboulides. This indicates that, even close to their place of origin the dating of the art objects of the Hellenistic period is far from settled.

The beginning of the Hellenistic age is put at about 334 B.C., and closes historically with the fall of the Seleucid and Ptolemaic kingdoms, but artistically it continues for varying and almost indefinable periods, for it is doubtful whether art influences once created ever wholly die. The perpetuation of Hellenism is not to be found in Greece itself, but primarily in Magna Grecia, Asia Minor and Syria and the islands fringing these countries, and in Italy and Sicily. The impulse spread

¹ Pl. XLV, Indian Sculpture, Stella Kramrisch.

² Pl. LXX, Hist. of Indian and Indonesian Art, A. K. Coomaraswamy.

³ The Greeks in Bactria and India, W. W. Tarn, p. 394.

⁴ Last Lectures, Roger Fry, p. 202.

⁵ Later Greek Sculpture, A. W. Lawrence, pp. 45, 126.

to the whole of the Seleucid Empire and thence to Bactria, India and China. It was kept alive by those arch-copyists and philo-hellenes the Parthians, and traces survive in India as late as the seventh century, and in China into T'ang times. Moreover it can now be said with a considerable measure of confidence that the peak period of Hellenism in the Middle East was from 150 B.C. to 120 A.D., and to date any piece with exactitude within this period is a matter of some considerable difficulty.

We should now review what there is of Hellenistic material stretching from Asia Minor and Syria to Bactria and India. In Asia Minor we have abundant remains of considerable merit, especially as regards sculpture, ranging from the Pergamene Battle of gods and giants to the Augustan sculpture at Aphrodisias. Palmyrene sculpture shows a more considerable measure of local influence, similar to that which we shall find further East. In Mesopotamia, along the trade routes to Central Asia at Dura Europos and Seleucia, sculpture is scarce and we have to rely on painting and particularly on terracotta figurines for our evidence. Bactria was proclaimed by Foucher to be void of art objects though this must be qualified in the light of more recent research. Our review moving eastwards now brings us to the region we intend chiefly to examine, the Paropamisadae and Gandhara. Here again, though sculpture in stone and in stucco is abundant it is to the terracottas that we shall chiefly look to give us the evidence we require. For it is of terracottas in particular that Evert Barger is speaking when he suggests that they, together with beads, seals, and pottery, might become an international currency in the hands of archaeologists.¹

Let us now examine those objects which are reputed to have been made for the Indo-Greeks by themselves: the silver repoussé Dionysus and the bronze statuette of Harpocrates from Taxila. Marshall dates the former to the second century B.C. and the latter to the first century B.C.² The objects were found together among articles which were possibly buried at the time of the Kushan invasion, so they date not later than about 50 A.D.³ but as they are almost certainly imports, particularly the Harpocrates which is suggested by Lawrence as being of Alexandrine origin, an upper date can be purely conjectural and of no real importance to the matter under discussion. Tarn instances one other object as being a product of Greeks for Greeks, this is the Athena in the Lahore Museum. Being a blue schist carving, this attribution has considerable

¹ Mem. Arch. Survey of India, No. 64. Excavation in Swat and Explorations in the Oxus territory of Afghanistan, E. Barger and P. Wright, p. 4.

² A.S.I. Annual Report, 1912-13, p. 27.

³ A Guide to Taxila, Marshall, p. 92.

bearing on the matter under discussion, or would have if it meant anything. Tarn has obviously not seen this figure, nor had the writer when he read Tarn's book, and so it was a statuette, possibly in bronze, displaying an Athena of the type found on the coins of Azes which was anticipated. The actual Athena is distinguishable as such only by her helmet, and is as definitely Indian as is more than ninety per cent of Gandharan sculpture. There is no evidence for the production of any art object whatsoever by the Greeks for themselves in India.

Tarn is very persistent that the art of Kushan Gandhara must be in some way connected with the Bactrian Greeks.¹ Foucher dug with a large number of workmen for eighteen months on the site of Bactria but found nothing to indicate a high level of Hellenistic culture. The idea that every city which displayed on its coinage a goddess with a turretted head-dress was a Greek polis, and that as it was a polis it must have had a theatre, a gymnasium, et cetera, is one that is not likely to be upheld by the evidence of the spade. Experience of sites of this general period, i.e. 250 B.C.-400 A.D., convinces the writer that, if there was much to be found at the site of Bactria, material would have been forthcoming in sufficient quantities to justify a verdict from Foucher very different from that which he gave. Very considerable familiarity with the site of Pushkalavati, in the general vicinity of Charsadda, has not indicated that this city is likely to differ to any extent from that of Sirkap at Taxila. Tarn, quoting Hargreaves in Foucher's *Ancient Geography of Gandhara*, speaks of the Stupa of the Eye-Gift towering aloft on the acropolis of Pushkalavati. This has no real meaning, as the mound of the Bala Hissar, the whole mass of which was thought by Foucher to be the Stupa of the Eye-Gift itself, is in reality nothing but one of those Dheris, Daros or Tels which cover the Middle East, and which are the artificial product of the debris of continued occupation and the collapse and rebuilding of mud wall buildings. Anyone viewing this mound in the light of modern knowledge can see quite clearly the main habitation levels, floors, hearths, sump-pits, the whole studded with pottery. Foucher's sneer that one might as well call it a pigeon cote as the Bala Hissar, shows incredible lack of observation, not only archaeological but ornithological as well, as the birds which inhabit this and all other mounds of the Peshawar plain are minas.

The only thing that we know for a certainty in Colonial Greek style for Colonial Greeks in this region was their coinage. The superiority of Colonial Greek coinage over that of the homeland is a strange phenomenon, but the fact remains that the Colonial Greeks produced the finest coins ever minted in any

¹ Tarn, *op. cit.*, p. 395.

age, no other coins have excelled them. The writer was once of opinion that a certain style of Hellenistic terracotta, found fairly plentifully throughout Gandhara, were also relics of the Bactrian Greeks, but such archaeological evidence as we now have does not support this idea. It is, however, these and other terracottas which are going to be of the greatest value in solving the Hellenistic problem.

Terracottas formed the sculpture, sacred or profane, of the ordinary household. Throughout the Near and Middle East, terracotta figurines have an unbroken history dating back almost indefinitely. They have provided the household gods and votive offerings for hundreds even thousands of years. During the period 200 B.C. to 200 A.D., throughout the Greco-Roman world, a Hellenistic female type, often in the postures and nakedness of the oriental Mother Goddess, became popular alongside with other and more definitely local and oriental manifestations. Great quantities of these figurines have been unearthed at Seleucia on the Tigris, and they are found also throughout the Gandhara region from the Kunar Valley on the West to Taxila on the East, South as far as Akra near Bannu and North into Bajaur. Along with these figures and of an inclusive date are to be found primitive peg-shaped female figurines having the characteristic applied and incised eyes which distinguish them from all others. The date of these latter figures is now definitely established by excavation, and while the earliest found may be as early as 200 B.C. the latest are as late as 250 A.D. and possibly later. They have a Syro-Mesopotamian origin, but a recent one, which dates in all probability no earlier than the conquests of Antiochus the Great. It is therefore a little short of horrifying to find that A. K. Coomaraswamy, not content with labelling such figures with a middle 2nd millennium dating in his article in *IPEK* 1927, which was excusable with regard to the state of knowledge on this subject at that time, well knowing that these figures come from the Gandharan region, produces one of them as an 'Indus Valley figurine' in his article in the *Encyclopaedia Britannica*. This is a most disingenuous misrepresentation. These crude figurines are very common, being present in many hundreds possibly thousands throughout Gandhara, Hellenistic ones being much more scarce but suffering a ready deterioration. It is difficult to determine what this deterioration is due to, but it is more likely that demand produced careless workmanship than that the deterioration shows any progressive lack of skill.

There is a strong similarity between terracottas of Hellenistic style found in Gandhara and those found at Seleucia. Miss Wilhelmina Van Ingen's excellent monograph¹ on these

¹ *Figurines from Seleucia on the Tigris*. Wilhelmina Van Ingen.

latter finds is a mine of stimulating information on the subject of the terracottas of this period in general. Her remarks concerning the mass production methods of the image makers of Seleucia apply with equal force not only to those of Gandhara, but, as the writer pointed out many years ago, to those of Mathura as well. So long as the image makers had a mould, they turned out their mass produced article with a moderate efficiency; even so, as Miss Van Ingen points out, their assembling of double mould figures was often slap-dash and crude. Without a mould they were lost, and could only produce the primitive style of figurine which has deluded so many wishful thinkers into endowing them with a quite fictitious antiquity. Figs. 1-4 show typical Hellenistic terracottas, which by analogy with those from Seleucia, are to be dated from some time in the period first century B.C.-first century A.D. The evidence of the heads of this type found at Taxila points, however, to the Saka-Parthian as being the more exact period of production, that is from about 50 B.C. to 50 A.D. After 50 A.D. there is reason to believe that the mould-makers developed a more varied and individual style, and a number of terracottas were produced which showed much more of life and character.

Terracottas are most disobliging from the point of view of conforming to contemporary sculpture, and this makes them even more difficult to place. Moulded terracottas typical of late Sunga times are found widely distributed from Sar Dheri in the North-West, eastwards through Muttra to Kosambi, Bhita and Basarh, and it is on the heels of this type that we get the influx of moulded Hellenistic terracottas. These also appear as far East as Basarh, where previously, on the authority of Dr. Spooner, such terracottas were attributed to Persian influence in Mauryan times. There is no evidence to support this, and Parthian influence at the turn of the millennium B.C. to A.D. fits the archaeological facts much closer.

The Hellenistic figurines are almost entirely female and show a nude goddess with a wreath or diadem headdress, the hair drawn back into a single thick braid, and at the top of the braid at the back a plate-like head ornament. In good specimens the hair is clearly indicated, the plate has a pattern on it, the wreath or diadem is carefully applied, the features are well defined, and the body has depth. As the work deteriorates the braid disappears and with it the plate, or they become merely a tuft at the crown of the head. The features become more blurred until in some exceptionally poor pieces they disappear altogether. The body, which is in two pieces back and front, loses depth owing to the two portions being moulded flat and stuck together like a sandwich.

Fig. 5 shows a definite orientalizing of this female figure, which is on the whole a great improvement. The head is not fixed with complete frontality, thus giving the whole figure

a more lively appearance. This figure, unlike those just described, is the product of a single mould, and the arms are not wholly free from the sides, gradually this type deteriorates through examples employing only a single mould, with the figure becoming steadily flatter and the arms merging more and more into the background of the plaque. It is doubtful whether we shall ever know for a certainty just to what cause this deterioration in terracottas should be attributed; it is observable, however, very clearly in at least four different types, possibly more. One thing appears to be quite certain, it is not due to a falling off in the skill of local craftsmen. Demand one feels produced a lowering of standards, and cheap reproductions of popular types were turned out on mass production lines to serve the needs of the poorer classes.

Such terracottas as we have been describing are relatively scarce in the West, a few have been found at Tarentum, but eastward from Myrina, which is famed for its terracottas, they are plentiful. Few of the Hellenistic terracottas from Gandhara have any counterparts outside the Middle East. The exceptions are a class of terracotta, and a single figure from that amazing site Sar Dheri, which has produced a more striking variety than any other site in Northern India. The single terracotta is represented only by the head and torso, from waist to knees, of a small statuette of the familiar Western Hellenistic Venus de Milo type, having drapery slipping from the hips. The class is even more interesting as it has excellent dating value. Shallow bowls having a design, usually a portrait, embossed in the centre, known to classical archaeologists as 'emblemata bowls' were popular in Italy in Augustan times. These Indian terracottas, of which specimens are shown in Fig. 6, are of exactly this type. The examples show two similar portraits, a young man right and a girl left, and in the centre a philosopher. Another example has Cupid and Psyche, and one in the Lahore Museum has two figures holding a drinking cup. These are by no means common as only some seven or eight specimens are known to the writer, but they are securely dated, allowing for a few years for this fashion to spread, to the first half of the first century A.D. In addition to these are some bearded male heads, some of which, as for instance that in Fig. 4, are of the style which do duty for philosophers or ascetics, and others such as Fig. 7 are of the actor's mask type. A figure with a tragic mask, of a type found also at Seleucia, was unearthed in the vicinity of Swabi, possibly at the large mound near the village of Turlandi, where a large number of terracottas have come to light. As anything of true Gandharan type in terracotta appears to be at a higher level than these terracottas of Hellenistic style, and a sufficiency of true Gandharan types have been found to make such a juxtapositioning possible, it looks as though the earliest Gandharan sculptures are unlikely

to be older than early in the first century A.D. This is not proof conclusive, for, as has been already pointed out by Barger, the terracottas on the habitation sites and remains of Gandharan sculpture are not much found together.

Let us now examine the Gandharan sculpture itself and see how much of Hellenism there is in it. Influence is of course undeniable, but anything that suggests the copying of Greek originals is very scarce. There are three or four reliefs which show considerable Western influence, and which are copies or memories of existing examples. The lack of full comprehension is obvious in the instance of the frieze of River Genii, having the most extraordinary display of pectoral muscles rendered by a series of small circular bosses. In addition to the above, certain bearded figures in seated or crouching postures, mostly of the type designated as Atlantes figures, are closely of the type exemplified by similar figures supporting portions of the Theatre at Athens. The so-called Apollo type of Gandhara Buddha, except for the straightness of the nose, bears no real resemblance to any Apollo produced in Greece. The writer has a particularly fine head with a far firmer and more masculine look than is found in practically any other specimen he has seen either in the Lahore or Peshawar museums, but there is nothing particularly or peculiarly Apollo-like about it if one were to set it beside the Apollo Belvedere.

Compared to those of the sculptures at Sanchi and Barhut these faces look more European. But the faces of Gandhara did and do look more European. This is purely fortuitous, people of that sort lived there, and from Vedic times when the Gandharas were considered to be regrettably mixed up with Mlechchhas, they have mingled more with the outside world, been more receptive to outside influences, and rightly or wrongly considered themselves for a variety of reasons, which it shall be no business of ours to specify here, much superior to those who live South and East of the Indus and its tributaries.

When dealing with Gandharan sculpture we are up against a formidable array of difficulties. We have a mass of material, a very great deal of it of extremely indifferent quality, which presents no real clue that is going to help anyone in dating it or even in arranging it in any acceptable art sequence. From the fourth to the eighth centuries, when the influence of Gandharan art finally faded away, dating is now on a firm basis, but in the earlier periods there is as yet little to guide us. To fit the facts however, one must accept as a working hypothesis the contentions of Dr. C. L. Fabri. As he points out in his most important article in 'Asia' the introduction of Hellenistic features would, as the history of such influences in India shows, come gradually, and the so-called Indianizing of Gandharan sculpture would not therefore be a deterioration, but itself the original basis of this art evolving directly from the Indian art of Barhut and

Sanchi; it is therefore Indian and not Indianized.¹ Only in this way can one show that continuity which is inevitable in art history, as Fabri says—‘There are no gaps in human history’, and the art of Gandhara evolves naturally, absorbing such influences as were then current in the Middle East.

Only the patronizing air he adopts towards Bachhofer induces one to examine the amazing statement that Tarn makes about the stucco heads from Hadda. Tarn, with his exiguous knowledge of art history in general, expects that Bachhofer should have some inkling of the explanation as to why these heads, which are of the fourth-fifth centuries A.D., should look like Hellenistic work of the second century B.C.; and then in a footnote he makes his masterly expositions, namely that—‘The stucco heads were cast in old Hellenistic moulds and then attached to the fourth century A.D. bodies.’² Firstly, were there any old Hellenistic moulds, if so, what evidence have we for their existence? If there were, did the makers of these Hellenistic moulds, presumably in the first or second century B.C., make them so that they might be used for the first time four hundred years later? If second-hand Hellenistic head moulds were employed, what then is the explanation of the excellent Hellenistic bodies, such as that of the young man with flowers in the lap of his robe and the child with its robe looped into a hood?³ There is nothing in stucco made from such moulds in these regions at an earlier date, and there is much to show that there is excellent work in the second and third centuries A.D., both in terracotta and stucco, leading up to these types. In fact, Tarn reveals nothing except the fact that he has no knowledge of Gandharan art at all.

It will be as well if we attempt to work back from the terracotta heads of Akhnur and Ushkar and the stucco heads of Hadda, the date of which is accurately known, to the earlier more debatable work in Gandhara. The terracottas of Ushkar are in the opinion of Dr. Fabri the very last remains of Hellenism in N.W. India, and he places them a generation later than those of Akhnur. This has geographical considerations in its favour taken as an assumption that the last traces of Gandharan culture retreated further and further North from Taxila through Akhnur in Jammu into Kashmir. Relics of Buddhism have been found at Ushkar, Harwan and Avantipur. The terracottas of Ushkar are, however, far less rococo than those of Akhnur and may for the most part be distinguished by the steeply flaring, sharply marked brow ridges. The terracottas of Akhnur are loaded with ornamentation and are of soft podgy types, wholly

¹ Buddhist Baroque in Kashmir, C. L. Fabri, *Asia*, October 1939.

² Tarn, *op. cit.*, p. 398.

³ L'Oeuvre de la Delegation Archeologique Francaise en Afghanistan, Hackin, 1933. Figs. 5 and 11.

lacking in any virility. The terracottas of Ushkar can be dated by the Monastery of King Lalitaditya, 700 to 736 A.D., and those of Akhnur may well, as Fabri suggests, precede them by a generation.

At Taxila a fair number of Late Gandharan terracotta heads have been found, the most common type being that of a youth with head inclined sideways, having a diadem and a fringe of conventional curls, and wearing rather a sickly smile. This type is also common at Hadda, so that these terracottas and the terracotta Buddha heads found with them can be dated to the fourth and fifth centuries A.D., and are contemporary with the stucco work at Jaulian and Mohra Moradu, at which latter place many of them were found. There is, however, a great deal of stucco work all over Gandhara much of which, as Fabri has pointed out, is quite indistinguishable in a photograph from the sculpture in schist. It is only the fact that the finding of a coin of Theodosius II at Hadda, in such circumstances as to date at least a portion of the stucco work there, has tended to label the whole stucco output of Gandhara with a fourth-fifth century dating, which has obscured the possibility that some of this work is almost certainly at least a century earlier. The magnificent stucco head of Buddha in the India Museum, South Kensington, shown as a 'Head of Bodhisatva' on Pl. X *b*, in Dunbar's History of India, is in all probability work of the third century, and it is probable also that many other pieces such as the Kuvera and Hariti at Takht-i-Bhai¹ are of the same date. The most striking heads at Hadda are those which strangely enough present the least Hellenistic characteristics. The bearded head resembling a mediaeval Christ and the monk with most sensitively rendered features owe no real debt to Hellenism, nor does the vivid female figure grasping two plaits. Influences were at work producing a fresh vital art which stamps with an even clearer mark of absurdity the contention that these heads were cast from moulds made originally in the second century B.C. That this vitality was confined to the art of Hadda is an idea which has gained considerable currency, and it has been fashionable to belittle the achievement of Gandharan art to the point of selecting those least admirable and lifeless examples and putting them forward as typical of the best that Gandharan artists could produce.

To show what could be done, here is the head of a bearded ascetic in terracotta (Figs. 8 and 9). It bears no relation to the plump-cheeked pseudo-ascetics of Ushkar and Akhnur. There may be something of what is termed 'expressionism' about this head, but it has that intensity and vitality which are essential to a true plastic interpretation of the subject. Such a

¹ The Mother Goddess of Gandhara, Gordon, *Antiquity*, March 1937. Pl. I.

head is almost certainly a product of the third century and comes from the Charsadda area. If there is anything Hellenistic about it, such traces are only perceptible to those who, willy-nilly, are set on finding them. Where Hellenistic models suit the purpose of the Gandharan craftsmen, they employ them, but by far the majority of the finest works of art from this region show only those traces which pervaded the whole Middle East at that date.

Figs. 10 and 11 show a unique head from the vicinity of Tangi, the most northerly of the Hashtnagar villages; it is a large terracotta head, a copy of a Hellenistic barbarian type, it is the hair treatment, however, which is the most striking feature, as these wavy tangled locks, so common in Hellenistic statuary, normally disappear in the conventionalized whorls and ridges found on the stucco heads at Hadda, Taxila and elsewhere. Good Hellenistic types are therefore not the prerogative of Hadda, but were produced whenever and wherever the Gandharan artist felt that they suited his purpose. It is impossible to shut off the work in stone from that in stucco into separate watertight compartments, and it cannot really be doubted that they co-existed, and that the monasteries more remote from the Swat hills, such as those little establishments at Askaru Dheri, Kula Dheri and on the ridge of the Marble Rocks, north of the Kabul river just outside Nowshera, were turning out images in stucco at the same time as the monks of Loriyan Tangai and the monasteries, known only to image traffickers, north of Mian Khan and Sangao were producing the best work in the blue schist of the hills in which they lived.

It is now possible to arrive at some tentative conclusions. In N.W. India, Hellenistic terracottas are found which follow closely on the heels of late Sunga terracottas of about 120-80 B.C. Similar ones are found at Seleucia where the majority can be dated 140 B.C.-120 A.D. and at Memphis in Egypt where they can be dated by the style of local contemporary Indian terracottas to the first century A.D. The Seleucia dates give extreme marginal limits for this style of figurine, but the Taxila finds indicate 80 B.C. as being the highest date for them in Gandhara. Bactria produced no Hellenistic art, but Barger discovered pillar bases of Corinthian style at Kunduz,¹ and in the same neighbourhood stucco heads and fragments were discovered at a monastery site; these have been dated by M. Hackin as being somewhere in the period first century B.C. to first century A.D., though there seem to be no very strong grounds for such a conclusion. The Gandharan carvings of a more definitely Indian style, deriving clearly from the art of Barhut and Sanchi, are as Fabri maintains the earliest, and both in stone, stucco and terracotta Hellenistic influences pervaded N.W. India

¹ Barger, *op. cit.*, p. 43, and Pl. IX, 4.

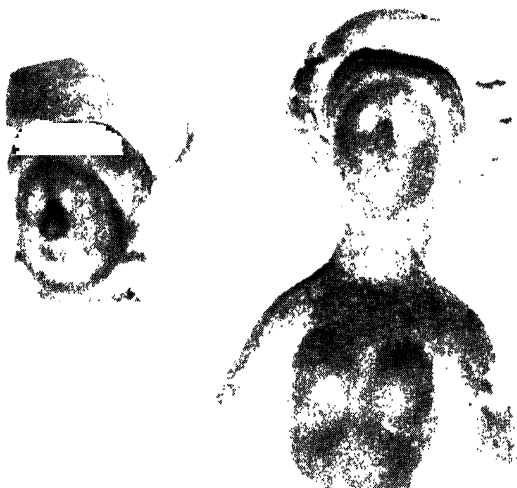
from late first century A.D. up to their final disappearance in the seventh century.

All the terracottas of the Saka-Parthian period are not of Hellenistic style. In the same way as at Seleucia there are primitive products, and also local types such as male figures with moustaches, beards and pointed Iranian caps. Male types with headdress knotted up on one side, such as are found at Muttra, persisted over a long period showing a continuity of this type from late Sunga to late Kushan times. Kushan terracottas show greater variety than their predecessors, but continuity can be shown late on into Gupta times, and in Kashmir at the site of Avantipur possibly as late as the tenth and eleventh centuries, when the iconographic terracottas of Northern India seem to come to an end.

It is unlikely therefore that the Hellenistic characteristics were produced by any specially imported artists or craftsmen, but were part of widespread art influences throughout the Middle East, the inevitable consequence of the Hellenistic dynasties set up as a result of Alexander's conquests. Much, if not the greater part, of the spreading and continuance of this Western influence was the result of the deliberate fostering of such art by the philo-hellenic Parthians, and it is not until they are firmly settled in India that we get art objects of Hellenistic style appearing alongside local primitive products, and succeeding the sculptures with influences from Sanchi and the terracottas of Sunga style. Though we have a mass of material of all types at our disposal, we have a great deal yet to learn about it, and new objects are continually appearing which do much to upset established notions. In fact the whole matter of Gandharan dating calls for review and revision in the light of recent discoveries and ideas, and also one hopes in the light of fresh extensive excavation, as yet not attempted, at the site of the Bala Hissar at Charsadda.

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11

Mathura Lion-Capital Inscriptions.

By HABIT KRISHNA DEB.

The remarkable Lion-Capital, covered over with Kharoshthi writing, found at Mathurā by the late Pandit Bhagwanlal Indraji and bequeathed by him to the British Museum, has from time to time been made a subject of discussion by Indologists who have expressed divergent opinions on the reading and interpretation as well as upon the fundamental question of the manner in which its different parts are to be inter-related. For instance, M. Barth held that what we have before us is not one single record, composed or engraved at the time the pillar was set up, but a series of records not all contemporaneous with the first consecration. Professor Lüders, on the other hand, expressed the view (*SBAW*, 1913, pp. 415ff.) that it is one single inscription. The latest treatment is due to Professor Sten Konow who, in editing the record in the *Corpus Inscriptionum Indicarum*, Vol. II, Part I, pp. 30–49, opines that, at all events, there can hardly be any doubt that the whole has been executed at the same time. But I venture to differ. The capital was damaged when section I was engraved, as will be evident from the fact that there is a large chipped-off surface avoided by the engraver.

Professor Konow's reading and translation, marking in many respects an advance on previous attempts, may most conveniently be cited as bases for discussion herein. I may add that I have had the advantage of a close inspection of the plaster-cast in the Indian Museum.

PROFESSOR KONOW'S READING.

A

(1) mahaksha[tra]vasa Rajulasa (2) agramahesh(r)i Ayasia (3) Kamuia dhit(r)a (4) Khar(r)aostasa yuvaraṇa (5) mat(r)a Nada Diakasa [taye] (6) sadha matra Abuhola[e] (7) pitramahi Piśpas(r)ia bhra (8) tra Hayaūrana sadha Hana dhi[tra] (9) a[te]urena horakapa (10) rivarena iś(r)a pradhnaviprat(r)e (11) ś(r)e nisime śarira prat(r)ithavit(r)o (12) bhak(r)avat(r)o Śakamunisa Budhasa (13) Muki[śri]raya saśpa [a]bhhusavi[ta] (14) thuva cha sagharama cha chat(r)u (15) diś(r)asa saghasa sarva (16) stiva-t(r)ana parigrahe.

E

(1) Khar(r)aosto yuvaraya (E') Kamuio (2) Khamamasa Kumara (3) Maja kaniṭha (4) saman[u]mot(r)a(E'')k(r)a karita

B

(1) mahakshatravasa (2) Va(ra)julasarputra (3) Śudase
kshatrave

C

(1) Kaluī a (2) varaḥo

D

Naūludo

M

(1) kshatrave Śuḍi(ḍa)se (2) imo paḍhravi (3)prat(r)eś(r)o

(1) Veyaūdirna kadhavaro Busapa (2)ro kadha (3)varo
(4) vi ya u

J

(1) rvaraparena palichhina (2) nisimo karita niyat(r)it(r)o

H'

dhamadana

H

guhavihare

KL

(1) ayariasa (2) Budhat(r)evasa (3) ut(r)aena ayimi[ta]

F

(1) Budhilasa nak(r)araasa (2) bhikhusa sarvastivat(r)asa

G

(1) mahakshat[r]avasa Kusul[u]asa Patikasa Mevaki[sa]
(2) Miyikasa kshat[r]avasa puyae

J3

sarvastivat(r)ana parigrahe

N

(1) ayariasa Budhilasa nak(r)arak(r)asa bhikhu (2)sa sar-
vastivat(r)asa pagra (3)na mahasaghiana pra (4)ma ſavit(r)ave
Khalulasa

O

- (1) sarvabudhana puya dhamasa (2) puya saghasa puya

P

- (1) sarvasa Sak(r)asta (2)nasa puyae

Q

- (1) Khardaasa (2) kshatravasa

R

- (1) Takshilasa (2) Kroninasa

J'

- (1) Khalaśamu (2)śo.

PROFESSOR KONOW'S TRANSLATION.

'The chief queen of the mahākshatrapa Rajula, Ayasia Kamuia, the daughter of the yuvarāja Kharaosta, the mother of Nada Diaka, by her, together with her mother Abuhola, her father's mother Piśpasi, her brother Hayaūra with his daughter Hana, the harem and the almslord chapter, was established in this piece of land, which is just outside the (saṃghārāma) border, the relic of the Lord Sākyamuni, the Buddha—after having performed the solemnities over the illustrious king Muki and his horse,—and a stūpa and a saṃghārāma, in the acceptance of the order of the four quarters of the Sarvāstivādins.

The Yuvarāja Kharaosta, Kamuia, having made prince Khalamasa (and) Maja, the youngest, assenting parties, by the mahākshatrapa Rajula's son,—the younger brother of Kaluī—, the kshatrapa Śuḍasa, Naūluda,—by the kshatrapa Śuḍasa this piece of land, (viz.) the encampment Veyaūdirna, and also the encampment Busapara, limited by Urvarapara, was granted, after having made it (an appurtenance just) outside the limit—as a religious gift in the cave-monastery,—having given it, with (libations of) water, to the teacher Buddhadeva: to Budhila from Nagara, the Sarvāstivādin monk,—in honour of the mahākshatrapa Kusuluka Patika (and) the kshatrapa Mevaki Miyika,—in trust of the Sarvāstivādins: to the teacher Budhila from Nagara, the Sarvāstivādin monk, a khalula (dialectician?) to teach the foremost Mahāsāṃghikas the truth; as honouring of all the Buddhas, honouring of the Law, honouring of the Order; in honour of the whole Sakastana, of the kshatrapa Khardaa, of Takshila Kronina. Khalaśamuśa.'

READING.


— Upon the reading, I venture to propose a few modifications:—

A

L. 5. [*taye*]—The letters are not visible, and the space may have been left uninscribed.

L. 8. *Hana dhi[tra]*—Read *Habanisa*; cf. *bu* in *Abuhola*, line 6, *na* (wavy) of section D; the *i-mātrā* of *ni* partly coalesces with the lower half of the curve of the next akshara *sa* which again is distinct.

L. 7. *Pispaśri*—Read *Pishpaśri*; there is, in *shpa*, a continuation of the upper curve to the right.

L. 9. *a[te]urena*—Read *ast[r]aürena*. What K. reads as [*te*] was left unread by Bhagwanlal; and Dr. Thomas, after stating that it looks like *tra*, takes it to be miswritten for *te*. To my eyes it is clearly *stra* though the *r*-hook is indistinct. The form  found on Indo-Greek coins is cursive; in Aśokan records, we find an alternative form of *sta* (Bühler's Chart, Tafel I, col. IV. 39) showing the non-cursive way which is seen to be followed in our *stra* here.

L. 13. *Muki[śri]raya saśpa (a)bhusavi[ta]*—Read *Ma(?)-śakitri-rayasaśpae bhusamvi(ta)*. The indentations at the edge are misleading. Thomas read *ma* (? *mra*) *kiṭe*. K.'s plate shows a break in the continuity of the vertical line of his supposed *mu*; if we recognize the break, we may perhaps read *maśa* in place of his *mu*, said to resemble the *mu* of the Taxila copper-plate. Upon the Lion-Capital itself the syllable *mu* is thrice employed—in A(3), A(12) and E'—and, on all three occasions, the shape is cursive and radically different from the shape found in the Taxila copper-plate. Regarding the next letter *ki*, there can be no two opinions; then follows a letter read as [*śri*] by K. 'with every reserve' (p. 39). Setting apart the *i-mātrā* recognized by K. (p. 39), we may discern a compound with what appears to be a subscript *ra*. It seems best to read the syllable as *tri*. Then follow *rayasaśpae bhu·amvi(ta)-thuwa cha sagharama cha*. The *saṁ* of *bhusamvi(ta)* seems certain. Instead of *rayasaśpae*, K. reads *rayasaśpa-a*, with diffidence, and he proceeds to combine the supposed *a* with the subsequent *bhusavita* to form *abhushavita*, arriving at an explanation which he frankly admits as 'highly hypothetical' (p. 40). We must read *e* after *śpa*, following Bhagwanlal and Dr. Thomas.

B

Vajulasa—Read *Rajulasa*. *Ra* is clear on the Indian Museum cast.

D

Naüludo—Read *Naülube*. The last akshara, had it been *do*, would not have exhibited the short upward stroke at the left end of the horizontal. The presence of this stroke has hitherto been apparently ignored. Syntactically, *Naülube* agrees best with *Sudase kshatrave*, while *Naüludo* with the *o*-ending would hardly go in with *Sudase* or with *kshatrave*, both with the *e*-ending which probably denotes a short form of the instrumental *-ena*. We shall see below that *Naülube* is derived from *Naulibi*, a town in Gandhāra.

G

Kusuhua—Read *Kusullaa*; cf. *lu* in *Naülube*, section D.

I-J-H'-H

L. 1. *Veyaüdirna*—Read *Veyaüdaku*. The supposed *i*-stroke is in reality one of the sculptured lines indicating folds of flesh, about which I have satisfied myself by an inspection of the plaster-cast in the Indian Museum. For *ka*, in place of K.'s *rna*, compare the other *ka*'s in the same section written cursorily by two strokes, reserving the lower portion of the left vertical for the second stroke.

After *veyaüdaka*, I go on to what I consider the next line, incised just below line 1, consisting of *ro kadha*, then (like Prof. Konow) to *viyaa*; differing from K. only in reading (with Bühler and Thomas) the last akshara as *a* instead of as *u*. The akshara is in shape essentially divergent from the other *u*-s found not only in the record under discussion but usually in all records of the post-Aśokan period.

Having thus read—(1) *veyaüdaka*, (2) *ro kadha*, (3) *varo*, (4) *viyaa* (the four lines following naturally one below the other, all incised on the body of one lion out of the two composing the capital), I go on to the top-line incised on the body of the other lion and continue down to the lines below, incised on the body of this other lion. The resultant reading is: *veyaüdakaro kadhavaro viyaakadhavaro Bubusaparvat(r)aparena palichhina nisimo karita niyat(r)it(r)o*. There is an akshara *bu* of small size, incised after the first *Bu*, to which Prof. Konow attaches no value. According to him, 'the record was first drafted in small letters on the stone, and then executed in larger size. The akshara *bu* has then not been cancelled with the rest of the draft and then subsequently engraved through misunderstanding'. The assumption seems quite gratuitous, and no parallel instance has been cited in support of it. It is more reasonable to regard the small letter *bu* of *Bubusa* as an addition by way of correction, like the small letter *e* of *puyae* in line 3 of the

Taxila copper-plate: in both cases, the diminutive size is clearly conditioned by limitation of space. Upon the same analogy, we should recognize the positive value of the small aksharas *viya* on the hip of the left lion, just before the large *-rva* of J(1), which are explained away by Prof. Konow as 'a remnant of the first draft' and interpreted by Prof. Thomas as possibly 'an insertion to show that the large *rva* is an error for *vya* = *viya*'. I look upon the letters *viya* as a continuation of H', H (*dhmadana guhavihare*) incised in equally small letters above M-I-J and evidently appended later than M-I-J. More letters after *viya* are discernible on the hip of the left lion; the Plate IV facing p. 142 of Rapson's *Ancient India* (Cambridge, 1916) seems to disclose three letters below *viya*—namely, *akadha*, of which the *ka* is distinct and the *a* and *dha* are slightly blurred. We can, I think, read *viya*[*a*]*ka*[*dha*] and then suppose that two more letters, *varo*, were engraved thereafter but have since disappeared. Sections H'-H should then read: *dhmadana guhavihare viya*—[*a*]*ka*[*dha*](*varo*). I may add that the body of the left lion shows a large chipped-off surface which must have suffered the damage already before section I was engraved; it necessitated separating *va*° from *t(r)aparena palichhina* and compelled the engraver to commence the next line (*nisimo karita*...) very much to the left.

The portion *veyaüdakaro*...*niyat(r)it(r)o* seems to be metrical,—a quatrain with sixteen syllabic instants to a line, usually known to prosody as *Mātrāsamaka* (var. *Pādākulaka*):—

veyāüdākārō kād̐hā-vā-rō
 vīyāākād̐hāvārō Būbūsā-
 parvāt(r)aṣpārēna pālīchhīnā
 nisīmō kārītā niyāt(r)it(r)o

N

pagrana—Read *sag(r)are*. The first akshara has been misread as *pa* owing apparently to a flaw in the stone; from the general level of line 2 we should be led to expect that the akshara began from below the *sa* of *Budhilasa* in line 1, even as the next akshara *gra* or *g(r)a* started from below the *Na* of *Nak(r)ara* in line 1. Following this indication, we can see that the letter before *g(r)a* is not *pa* but *sa*, very like the *sa* engraved just before it. The second akshara can be read as *g(r)a*, i.e. as a *ga* with fricative sound denoted by a curved *r*-hook; we may compare *k(r)a* appearing with the same kind of *r*-hook. The third akshara, with which line 3 begins, cannot be read as *na*; it is quite unlike the *na* after *Mahasaghia* in the same line; it has a left-hand element with a slightly curved top, and we should read it as *re*, since a short-curved *ra* is found in *Rajulasa* (section B) as well as in *Veyaüdakaro* (section I).

Mahasaghiana—Read *Mahasaghia na*.

K(r)oninasa—Read *K(r)ochh(r)anasa*. The second akshara may be compared with *chhi* in *palichhina* (section J) and *chhi* in line 10 of the Mansehra inscription (*Corpus*, pl. IV); abstracting the *i-mātrā*, the only noticeable difference is an additional curved *r*-hook, apparently denoting a modified sound like *k(r)a*, *g(r)a*, *t(r)a*, in these records.

J'

Khalaśamuśo—Read *Belaśamuśo*. There is a projection to the left of the first letter which has escaped notice hitherto and which guarantees the reading *Be*.

INTERPRETATION.

(I)

In regard to the interpretation, much depends upon determining the proper sequence for the different sections designated by scholars as A, B, C, D, etc.

What goes most strongly against the supposition that all the sections form part of one single record engraved at one and the same time is the circumstance that the letters vary considerably in size and in shape. Dr. F. W. Thomas* notes the sizes. Without insisting on the proposition that the sections must be arranged absolutely according to the sizes of the letters, we may observe that far bigger letters are employed in M-I-J, engraved on the front, than in A, engraved on the top and the back. If, moreover, we recognize that a natural commencement is to be sought on the front, we shall not be disposed to accept the current view that the 'chief inscription' is comprised in section A. In point of shape, also, there is marked variation between section A and the group M-I-J. To note major divergences: in the latter record, the vowel *u* has its loop to the right, the medial *o* is likewise formed with a loop, the *ka* is peculiarly written by first cursively combining the top-angle with the right-hand angle and afterwards adding the lower portion of the left-hand vertical, and the *ya* has a straight left limb; in section A, the vowel *a* has a curved right-hand element, the vowel *u* has an open loop to the left, the medial *u* has likewise an open loop, the *ka* has a slanting right-hand element, the *ma* is flat at bottom almost forming angles with the verticals, and the *ya* (except once) has the shape of an approximate semicircle. The hand that wrote out section A could hardly have written out sections M-I-J. A peculiarly shaped *sa*, we may add, isolates section G from the rest. And the small lettering in sections H', H, C, D, E is due, as we have seen, to their having been crowded in by way of additions and corrections.

Commencing then with the group M-I-J, incised on front in bold lettering distinguished in shape from the lettering in other portions of the Lion-Capital, we read:—

(M)

(I-J(1)(2))

kshatrave Śudise	Veyaūdak-	-kadhavaro Bubusa pa-
imo padhravi	-ro kadha-	-rvat(r)aparena palichchhina
-prat(r)eśo	-varo	nisimo karita niyat(r)it(r)o
	viyaa-	

The name *Veyaūdakaro* might be a derivative of *vi-udagra*, 'very exalted'. *Udakaro* for Skt. *udagra* would be normal; the dialect employed shows a tendency towards the substitution of surds for sonants, as in *prat(r)eśo* for *pradeśaḥ*, *Nak(r)araasa* for *Nagarakasya*; and *-kara* for *-gra* might illustrate the rule of dissolution (cf. *Prākṛitalakṣaṇam*, III. 30). That *kadhavaro* can stand for Skt. *skandhāvāraḥ* has been established by Prof. Konow (*Corpus*, p. 43). There is thus no difficulty in taking *Viyaakadhavaro* as Skt. *Vijayaskandhāvāraḥ* ('Encampment of Victory')—an expression not unfamiliar to ancient Indian land-grants. We may compare the Nasik cave inscription of Gautamīputra Śātakarṇi,¹ where the expression occurs. The comparison is justified not only because that record and the Mathura Lion-Capital Inscriptions belong practically to the same period (first century B.C.—first century A.D.), but also because Nasik was and still is, like Mathura, a place of strategic importance; military cantonments are even now located at Mathura and at Deolali, near Nasik. That is why Śātakarṇi's military exploits are mentioned with special emphasis in the Nasik inscription recording his mother's cave-dedication: the donation was inspired by some recent military success. The same explanation seems applicable to the Mathura dedication. *Palichchhina* may be connected with *pāli*, 'boundary', and *chhinna*, 'limited'; compare *śīmāvachchhinna* of later land-grants. In the Kauṭīliya Arthaśāstra (II. 1), we read of rocks (*śaila*) and caves (*darī*) being made to serve as boundaries (*śīmā*) of villages. Similar prescription is found in regard to Buddhist parishes. As noted by Kern²: 'The Buddha prescribed to mark out the boundaries of a parish, *śīmā*, in this way: first, the marks are to be mentioned, such as a *mountain*, a stone, a forest, a tree, a road, an ant-hill, a river, a water-sheet. This being done, a competent monk has to bring forward a motion that the Saṅgha may decree to fix by such marks the boundaries of a parish for common residence and common celebration of the Uposatha.' *Bubusa-parvataparena palichchhina* would thus sig-

¹ *Epig. Ind.*, Vol. VIII, pp. 60–74.

² Kern, *Manual of Buddhism*, p. 82.

nify 'limited in boundary by what is beyond Mount Bu(b)busa'. *Nisimo* has been clarified by Prof. Konow with Pāli citations furnished by Mr. Helmer Smith; it implies '(an appurtenance just) outside the limit (of a *vihāra* or *saṃghārāma*)'. The words *dhamaḍana guhavihare*, *viya[a]ka[dha](varo)*, constituting sections H'-H and forming a sort of heading to the group M-I-J¹ show that there was a pre-existing *vihāra* known as *guhāvihāra*, 'cave-monastery', to which the *dhamaḍana* or 'pious gift' set out in M-I-J appertained: it is likely that H'-H was added by way of correction like the second *bu* of *Bubusa*, both corrections being in small letters as demanded by the exigencies of space. *Karita* I take to represent Skt. *kāritaḥ*; loss of terminal *-am* and *-aḥ* is quite common in the dialect, and there can be no inconsistency in making *karita* agree with *niyat(r)it(r)o*, 'given', and *paḍhraviprat(r)eśo*, in view of the admitted apposition of *śarira* with *prat(r)iṭhavit(r)o* in section A and other similar instances. Prof. Konow's proposal to treat *karita* as a gerund cannot be accepted in the absence of any acknowledged analogy; his proposition that intervocalic *t* 'always becomes *tr*' on the Lion-Capital is itself founded on his supposition that *karita*, *bhusavita*, *ayimīta* are gerunds,—a supposition without any support.

If, therefore, H'-H sets out the nature of the donation and M-I-J(1)(2) contains the denomination of the donor as well as a description of the land given, we may expect that somewhere on the Lion-Capital there is reference to the denomination of the donee. This reference we must evidently recognize in J(3) which reads:—

Sarvastivat(r)ana parigrahe.

'For the acceptance of the Sarvāstivādins.' We meet with the same expression towards the close of section A which, as we shall presently see, is concerned with another grant to the Sarvāstivādins. The fact that J(3) is inscribed vertically on the body of the left lion seems to indicate a desire to preserve some sort of symmetry with M which is inscribed vertically on the body of the right lion.

Acceptance of the gift is recorded in sections K, L: (1) *ayariasa*, (2) *Budhat(r)evasa*, (3) *ut(r)aena ayimīta*, 'Of the āchārya Budhat(r)eva. Received with water'. The equivalence of *ut(r)aena* with Skt. *udakena* has been pointed out by Prof. Lüders. *Ayimīta* I propose to regard as the past participle of root *yam* preceded by the prefix *ā*; the roots *yam* and *dā* being synonymous, *ā-yam* would be synonymous with *ā-dā*, signifying 'to accept'. It was customary to accept donations of this character with water poured on the hands of the donee; for instance, we hear of Anāthapiṇḍika pouring water over the

¹ Cf. *danamukha* in Mount Banj Inscr. (*Corpus*, Pl. XI).

hands of the Buddha when giving away Jetavana-vihāra to the Saṃgha.¹

The group H'-H-I-J(1)(2)(3)-K-L-M thus represents a record complete in itself. It is a public record of the charter of land-grant, in favour of the Sarvāstivādin community, by the kshatrapa Śuḍisa.

(II)

We may now consider section A, inscribed on the top and back of the central block. It contains the phrase *sarvastivat(r)ana parigrahe*, 'for the acceptance of the Sarvāstivādins'—the same as in J(3) pertaining to the group recording Śuḍisa's land-grant. There cannot be the shadow of a doubt that section A is concerned with another grant in favour of the same (Sarvāstivādin) community. It records in fact the establishment of the relics (*śarīra*) of the Buddha, the interment thereof inside a *stūpa*, and the laying-out of a *saṃghārāma* for 'the saṃgha of the Four Quarters'. Its connexion with and posteriority to the land-grant of Śuḍisa will appear at once from its reference to 'the *nissima* piece of land' as the place of deposit of the relics: as we have seen, the inscription on the front records the fact that the land granted by kshatrapa Śuḍisa was made *nissima* with reference to the *guhāvihāra* or cave-monastery previously existing.

The donor here is a lady named Ayasi, with the epithet *Kamui*, described as 'chief queen of *mahākshatrapa* Rajula', 'daughter of *yuvārāja* Khar(r)aosta' and 'mother of Nada Diaka'. It will be observed that she is not described as 'mother of Śuḍisa' who, we know, was the son of Rajula. She was apparently Śuḍisa's step-mother. Associated with her in the donation are: her mother Abuhola, her father's mother Piṣpaśrī, her brother Hayaūra and 'the body of star-observing astrologers' of Habani (*Habanisa astraürena horakaparivarena*). The word *astraürena* (hitherto read as *atraürena*, *ateürena*, etc.) I take to be instrumental singular of **astraūra* compounded of two Greek words, *ἀστρον*, 'star', and *ῥας*, 'observe'.

The term *horaka* seems to have been derived from *hora* in the same way as the term *mauhūrtika* was derived from *muhūrta*. Astrologers, as noted by Alberuni,² used the unit of time known as *horā*, an interval of 60 minutes; and modern scholars, like Alberuni, feel no hesitation in recognizing its identity with Greek *ῥα* and Latin *hora*. The *muhūrta*, as we know, is an interval of 48 minutes; and *muhūrta* was a unit employed by Hindu astrologers prior to the advent of *hora* under Hellenistic influence. Just as the earlier astrologers were called *mauhūrtikas* because

¹ Kern, *Manual of Buddhism*, p. 28.

² *India* (Sachau), I. 343: 'Nobody in India uses the hours except the astrologers. . . . They call the hour *hora*.'

they calculated in terms of the *muhūrta*, the later astrologers seem to have been designated *horakas* because they calculated in terms of the *hora*. The form *horā*, with the long *ā*, is probably due to popular etymology which sought to derive the word from Skt. *ahorātra*, with the initial and final syllables (*a* and *tra*) omitted! Such a derivation is seriously cited by Varāha Mihira in his *Bṛihajjātaka*, ch. I, verse 1—*horetyahorātravikalpameke vāmchhanti pūrvāparavarṇalopāt* ('some take *horā* to be an optional form of *ahorātra* by reason of omission of the first and the last syllables').

It is noteworthy that, in a chapter entitled 'Encampment' (*Skandhāvāraniveśaḥ*) of the Kautīliya Arthaśāstra (X. 1), *mauhūrtikas* are mentioned as part of the staff accompanying every military expedition; and the *horaka-parivara* appears on the Lion-Capital in connexion with the foundation of a *stūpa* on a piece of land described therein as an 'Encampment of Victory' (*viyaakadhavaro*), *vijaya-Skandhāvāra*.

There is western classical testimony showing the special association of *stūpa*-worshipping *śramaṇas* with astrology at a period not far removed from the age of the Mathura Lion-Capital Inscriptions. Clemens Alexandrinus (third century A.D.) notes the circumstances that the *Semnoioi* 'make predictions about futurity and worship a kind of pyramid beneath which they think the bones of some divinity lie buried.... They observe closely the heavenly bodies, and, by the indications of futurity which these offer, make some predictions.' The *Semnoioi* have been recognized as *Śramaṇas*, and the pyramid as the *stūpa*.¹

The name *Habani* reminds us of the 'Indian' merchant alluded to in the *Acts of St. Thomas*; his name is spelt *Habān* in Syriac, *Ἀββάνης* in Greek, and *Abban* or *Abbanes* in Latin. The *Acts* associated Habbān with *Gundaphar*, 'King of India', who, as recognized long ago, is doubtless the Indo-Parthian ruler known to Indologists as Gondophares—Gondophernes.

Regarding the expression I tentatively read as *Maśakitri-rayasaśpae*, the element *raya* should be explained as *rājan*, 'King', since the mention of *Kharaosta* as *yuvarāja* presupposes the existence of some *rājan* to whom *Kharaosta* stood in the relation of *yuvarāja*. In *saśpa*, I propose to see Skt. *śasya*, 'corn', confounded with Skt. *śashpa*, 'young grass'; the figurative sense of *śasya* being 'merit'. A similar idea is conveyed by the expression *kuśalamūla*, 'root of virtue' occurring in other *Kharaosthi* records (*Manikiala*, *Hidda*, *Wardak*). It is worth noting that, after *rayasaśpae*, we get *bhusamvi(ta) thuva* which I take to represent Skt. *bhū-samvītaḥ stūpaḥ*, 'stūpa covered over with earth'—a rhetorically appropriate nuance, with perhaps an allusion to the original sense of *stūpa*. If we took the syllable *tri*

¹ McCrindle, *Ancient India* (1901), pp. 183-4.

along with *rayasaśpae*, we would have to think of 'three Kings' whom Ayasi wanted to benefit spiritually by her 'establishment'. *Maśaki-tri-rayasaśpae* might in that event be construed as 'for merit to the three Maśaki Kings', where *Maśaki* could be plausibly connected with *Massaga*, the chief city of the Assakenoi, which had been stormed by Alexander. And such a connexion would be supported by the occurrence of epithets like *Naūliba*, *Kamui*, *Nak(r)araa*, derived from place-names not very far from Massaga, in other sections of the same record. The initial *Ma*, however, is doubtful; and the interpretation must consequently remain uncertain.

Ayasi thus established, in the *nissima* land conferred by her step-son Śuḍisa on the Sarvāstivādins, not only the *śarīra* of the Buddha, covered over by a *stūpa*: she also laid out a *saṃghārāma* 'for the Four Quarters of the Saṃgha'. The *nissima* land appertained to the already existing *guhā-vihāra*. A distinction evidently existed between *vi h ā r a* and *s a ṃ g h ā r ā m a*; by the former term we are probably to understand 'a dwelling' for the monks, intended specially for use during the rainy season; while by the latter term we are presumably to understand 'a park (*ārāma*) for the assembly (*saṃgha*)' of monks. This distinction vanished in later times, apparently because to every *vihāra* there came to be attached a *saṃghārāma*; so that what was in truth a *vi h ā r a - cum - s a ṃ g h ā r ā m a* could, for brevity, be designated by either name. That the distinction was still being maintained during the Kushān period will appear from the Peshawar casket-record mentioning a 'pious gift' (*deyadhamma*) 'in Kanishka's *vihāra*, in Mahāsena's *saṃghārāma*',—in other words, in the *vihāra* founded by Kanishka to which had been attached a *saṃghārāma* by Mahāsena.¹ A Buddhist cave-inscription at Kanheri records the construction of a *saṃghārāma* beside a pre-existing *vihāra*.² Yuan Chwang (Hiuen Tsiang), who visited India in the seventh century A.D., speaks of *vihāra* and *saṃghārāma* side by side; for instance, writing about Kanauj, he says: 'Before each *vihāra* is a little *saṃghārāma*.'³ And it is not impossible that, as has been already suggested, the Chinese pilgrim actually saw at Mathura the very *vihāra-cum-saṃghārāma* which we are discussing.⁴

Assent to this gift from Ayasi is recorded in the group, incised on the back of the right lion, consisting of sections E and B. What is called E" (*k(r)akarita*) is, as recognized by Prof. Konow, a continuation of E(4) (*samanumot(r)a*), the two together reading—*samanumot(r)ak(r)a karita*, i.e. 'made co-

¹ *Corpus*, pl. XXVI. 'Mahāsena' seem to denote Huvishka who appears to have adopted the style in the same manner as Vima adopted the style 'Mahiśvara'. Huvishka's portrait occurs on the casket.

² Lüders' *List of Brāhmī Ins.*, No. 988 (*Epig. Ind.*, Vol. X, App.).

³ Beal, *Rec. W. World*, Bk. V, p. 222.

⁴ *Ibid.*, Bk. IV, p. 181.

assenters'. E should be read before B, since E occupies a position to the right of B, and the direction of Kharoshthī writing is from right to left. Additions in smaller letters are embodied in E', D and C(1)-C(2); of these, E' and D seem to have been inserted by way of correction, while C(1)-C(2) were added by way of supplement, because C(1)-C(2) are preceded by a caret-m a r k. We may thus read the group:—

- | | |
|---|------------------------|
| (E(1)) Kha(r)raosto yuvaraya | |
| (E') Kamuio | (B) { mahakshatravasa |
| (E(2)) Khalamasa kumara | { Rajulasa putra |
| (E(3)) Maja kaniṭha | (D) { Śudase kshatrave |
| (C(1)) Kalui a | (D) Naūlube |
| (C(2)) varajo | |
| (E(4)) sam a n u m o t (r) a k (r a) k a r i t a (E') | |

The spelling in Śudase is noteworthy as showing that the group does not appertain to the land-grant recorded in M-I-J where the spelling is Śudise; for we cannot well suppose two variant spellings of the satrap's name in the same document. This inference is corroborated by the different forms of *u-mātrā* employed in *Su* of *Śudisa* and *Śudasa*.

It will be observed that just as the word *Kamuio* is added against *Kha(r)raosto yuvaraya*, evidently to indicate that *Khar(r)-raosta* was *Kamuia*, i.e. (as perceived by Konow) 'native of Kamboja', the word *Naūlube* is added against *Śudase kshatrave*, evidently to indicate that *Śudasa* was *Naūliba*, i.e. (as I suppose) 'native of Naūliba'. The name *Naūlibi* occurs in Ptolemy's geography¹ as a town-name along with *Proklais* or *Pushkalāvati* (mod. Charsadda), in connexion with the *Gandaroī*, i.e. *Gandhāras*, 'between the Souastos and the Indus'; and, immediately before this mention of *Naūlibi*, occurs the enumeration of a group of town-names including *Nagara* (mod. Jelalabad), 'also called *Dionysopolis*',² a designation showing that it was re-founded as a Greek city (*polis*). The identification of *Naūliba* harmonizes with the circumstance that *Aśoka*, in his Rock Inscription, associated the *Yonas* (Greeks), *Kambojas* and *Gandhāras*. The expression *Śudase kshatrave Naūlibe* thus means, 'by kshatrapa *Śudasa*, native of *Naūliba*'.

The co-assenters are: the *Yuvarāja Kha(r)raosta*, *Khalamasa* (styled *kumāra*), *Maja* (described as *kanishtha*) and—as the supplement (C) added with a caret places on record—*Kalui* (styled *avaraja*). The styles show that the enumeration comprises *Kha(r)raosta* and his brothers. *Yuvarāja* denotes 'sub-king' (*lit.* 'young king' or 'junior king'); the *Kaūṭiliya* (I. 17),

¹ McCrindle, *Ancient India as described by Ptolemy* (Bombay, 1885), p. 115.

² *Ibid.*, p. 112.

in discussing the topic 'Protection of Princes' (*Rāja-putrarak-shaṇam*), recommends that the king should establish a wise son as *Yuvarāja* or *Senāpati* (*ātmasampannam saināpatye yauvarājye vā sthāpayet*); the Kauṭīliya further prescribes (V. 2), in discussing the topic 'Subsistence to State-servants' (*bhṛityabharaṇīyam*), that the *yuvarāja* is to receive an allowance of 48,000 (*paṇas*), while the *kumāra* is to receive an allowance of 12,000 (*paṇas*). Maja is called *kañiṭha*, Skt. *kanishṭha*, 'youngest', while Kalui is, in the supplement, described as *avarāja*, i.e. 'afterborn'. Kalui was thus evidently born afterwards; and Maja had been the youngest of the brothers at the time of Ayasi's donation when, Kalui being yet unborn, his name could not be entered as an assenting party.

Such assent must clearly have been deemed necessary to invest the gift from Ayasi with a strictly legal character. The assent of her father, the *yuvarāja* Kha(r)raosta, was alone apparently considered insufficient; the assent of every one of his brothers was so essential that the name of the afterborn Kalui had to be inserted afterwards. We may understand this in the light of the circumstance that 'succession among the Sakas sometimes passed from the ruling prince to his brother' (Konow, *Corpus*, p. xxxvi; Bühler, *J R A S*, 1894, p. 532): the brothers of Kha(r)raosta being expectant reversioners, legal formalities were felt to be incomplete without their assent. Or, perhaps, the government was akin to the *kula-saṅgha* type—a *yauvarājya* where the rulership resided in the *yuvarāja* and his brothers.

Acceptance of the gift from Ayasi to the Sarvāstivādin community is registered on behalf of Budhila in section F which reads—*Budhilasa Nak(r)araasa bhikkhusa Sarvastivat(r)asa*, 'Of Budhila, native of Nagara, a Sarvāstivādin *bhikkhu*'. It was in the fitness of things that section F should be engraved near sections K-L recording acceptance by Budhat(r)eva of the land-grant from Śudisa to the Sarvāstivādins. That F is posterior to K-L is proved by their disposition; the prior presence of K-L(1) prevented F(1) beginning further to the right, and the previous existence of K-L(2) stood in the way of F(2) commencing further to the right.

Prof. Konow's proposal to identify Budhila with Budhat(r)eva cannot be supported. Had the two been identical, we would have expected a more absolute identity between the names. We cannot imagine tautologous allusion to the same person at such close quarters. Moreover, Budhat(r)eva is expressly styled *ācārya* (*ayaria*) in K-L, while Budhila is simply designated *bhikkhu* (*bhikkhu*) in F, implying deliberate distinction.

The group A-B-C-D-E-F thus represents the second charter in favour of the Sarvāstivādins, recording the establishment of the *śarīra* (corporeal relics) of the Buddha, together with a *stūpa* and a *saṅghārāma*, by Ayasi, upon the land granted previously by Śudisa.

The disposition of section G, coming as it does after section F, will be most conveniently discussed now. That it was engraved by another hand is evident from its employment of a peculiar form of *sa*. That it was inserted later than J(3) can be inferred also with absolute certainty. As a glance at the plates will show, its second line begins not from below the commencement but from below the middle of its first line; such a disposition could only have been necessitated by the prior presence of J(3). The contents of section G corroborate the inference that it was a later addition. It reads—

- (1) mahakshatravaasa Kusullaasa Patikasa Mevaki(sa)
- (2) Miyikasa kshatravasa puyae

‘In honour of mahākshatrāpa Kusullāa Patika (and) of kshatrāpa Mevaki Miyika.’ The circumstance that ‘honour’ is accorded here to mahākshatrāpa Kusullāa Patika and kshatrāpa Mevaki Miyika, ignoring Śudisa-Śudasa, demonstrates that section G was added when Śudisa-Śudasa was no longer ruling at Mathura which had passed under kshatrāpa Mevaki Miyika,¹ himself subordinate to mahākshatrāpa Kusullāa Patika.

This conclusion has a bearing upon chronology. It renders possible the identification of Kusullāa Patika with Patika, son of Liaka Kusulaka, mentioned in the Taxila copper-plate, without prejudice to an explanation of its date (year 78) in terms of the same era as is employed in the Mathura Brāhmī epigraph (Lüders’ *List*, No. 59) in association with the name of Śudasa as *mahākshatrāpa Śodāsa*. The Mathura Brāhmī epigraph bears the date ‘year 72’ and refers to Śudasa as *mahākshatrāpa*. If the Lion-Capital Inscriptions be read together as one single document (as has been done by Konow), then we should have to infer that it was incised when Śodāsa was a *kshatrāpa*. On the assumption that he became first a *kshatrāpa* and afterwards a *mahākshatrāpa*—not first a *mahākshatrāpa* and afterwards a *kshatrāpa*—we would have to admit that the Mathura Lion-Capital record is earlier than the Mathura Brāhmī epigraph of ‘year 72’. Again, since the Lion-Capital Inscription mentions Kusullāa Patika as a *mahākshatrāpa*, it (as a single document) would be presumably later than the period when Patika was not yet even a *kshatrāpa*. On the assumption that this Kusullāa Patika is identical with Patika, son of Liaka Kusulaka, mentioned in the Taxila copper-plate—an assumption supported by the agreement between the styles *Kusullāa* and *Kusulaka*—the conclusion would follow that the Taxila copper-plate inscription bearing date ‘year 78’ is earlier than the Mathura Lion-Capital record and *a fortiori* earlier than

¹ Rapson (*JRAS*, 1894, p. 548) traces the name of a *ksatrāpa Mevaka* on a coin; see *Corpus*, p. 45, n. 3.

the Mathura Brāhmī epigraph bearing date 'year 72'. In other words, we should be driven to the position that the 'year 78' refers to one era, and the 'year 72' refers to another; unless of course we were prepared to suppose (as done by Fleet) either that the two Patika's were different, or (as done by R. C. Majumdar) that Śudasa may have been a *mahākshatrapa* first and a *kshatrapa* afterwards,—an exceptional circumstance. Recognition of the true character of section G of the Lion-Capital will obviate the necessity for these assumptions, leaving us free to regard the 'year 78' of Taxila and the 'year 72' of Mathura as belonging to one and the same reckoning which, I believe, was the famous Vikrama era of 58 B.C.¹

(III)

The group N-O-P-Q-R, engraved on bottom, may be considered next. It is noteworthy that the first line of section N, comprising 16 aksharas, runs from end to end of the bottom-surface, while the next three lines (i.e. lines 2-4), consisting of 8 to 10 aksharas each, occupy only the central portion of the surface. The result is that marginal spaces remain on both sides—one to the right (below the aksharas *ayari*), another to the left (below the aksharas *sa bhikhu*). Into these marginal spaces were subsequently inserted sections P-O-R.

I look upon section Q as a continuation of section N. Part of Q, consisting of the four aksharas *Khārdaasa*, was engraved upon the same face as N, on the right margin, below the aksharas *ayari* of line 1 of N and immediately after line 4 of N; the other part of Q, consisting of the four aksharas *kshatravasa*, appears practically on the front of the Capital, in an inverted order—a clear overflow from the back and a continuation of *Khārdaasa*. The original intention evidently was to symmetrically place *Khārdaasa* and *kshatravasa* in the same line,—the one below *ayari*, the other below *sa bhikhu*, of line 1 of N; but the scheme was frustrated by a chipping-off in the stone-surface so intended for accommodating *kshatravasa*. Symmetry had to be sacrificed, and *kshatravasa* had to be engraved just 'below' *Khārdaasa*.

¹ See my paper 'Vikramaditya and his era' in *Zeits. f. Ind. u. Iran.*, 1922, pp. 255ff., for the origin of the era. I argued there that the era of 58 B.C. was founded by Gautamīputra Śātakarnī who is called *vārāṇa-Vikrama* in his mother's Nasik eulogy; cf. *śimha-Vikrama* on coins of Chandra-gupta (II) Vikramāditya. I have since then observed that a Nasik epigraph of Vāsishtīputra Puṣumāyī is expressly dated in the era founded by his father (i.e. G. Śātakarnī);—*amhapituka-savachhare* should be read in place of Sénart's *amhohi savachhare*, as can be seen from Sénart's published facsimile. I have also satisfied myself by a personal inspection of the original cave-inscription at Nasik.

Reading N-Q together, we have—

- (N) ayariasa Budhilasa Nak(r)araasa bhikhu-
 -sa Sarvastivat(r)asa sag(r)a-
 -re Mahasaghia na pra [ma]
 ñavit(r)ave Khalulasa
 (Q) Khardaasa
 kshatravasa

The word *sag(r)are* may be taken to denote the instrumental singular of *sag(r)ara*, equivalent to Skt. *saṃgara*, 'promise'; we have similar instrumentals in *Śudase kshatrave Nāilube* of sections B-D. In *ñavit(r)ave* we shall no doubt be justified in seeing a survival of the Vedic infinitive in *-tave* which, with the negative, often had a passive force. Thus, the expression *Mahasaghia na prama ñavit(r)ave* may be held to mean: '*prama* (is) not to be taught to any Mahāsāṃghika'. *Prama* is most naturally explained as Skt. *pramā*, a technical term in Logic, signifying 'correct apprehension' or 'right knowledge'. This prohibition against *pramā* being taught to any Mahāsāṃghika 'according to the promise' *sag(r)are* of the Sarvāstivādin *āchārya*, provides important epigraphic evidence on the relations between the two rival Buddhist schools—the Sarvāstivādins and the Mahāsāṃghikas—about the beginning of the Christian era. The Mahāsāṃghikas were regarded as schismatic, and the Sarvāstivādins were also designated 'Hetuvādas' (more correctly, 'Hetuvādins'), i.e. 'professing the doctrine (*vāda*) of Logical Reasoning (*hetu*)' or 'causationists' (Radhakrishnan, *Indian Philosophy*, 2nd ed., p. 613 n.). The place of Logic in the history of Buddhism, as worked out by Dr. Stecherbatsky in his *Buddhist Logic* (Leningrad, 1932), enables us to determine the psychology behind the prohibition embodied in our inscription which pertains to the threshold of Stecherbatsky's 'Second Period' comprising the first five centuries A.D.—a period characterized by the rejection of all Logic, it being maintained that 'the only source of true knowledge is the mystic intuition of the Saint'. The Sarvāstivādin *āchārya* Budhila, belonging as he did to a school of thought that believed in the doctrine of logical reasoning, was naturally loth to see the *pramā* of their Logic being taught to the Mahāsāṃghikas who professed to believe in the doctrine of mystic intuition. Upon the earlier prestige of philosophers devoted to *pramā* (of which an equivalent is *pramāṇa*), Strabo throws some light. 'The *Pramnai*,' says Strabo, 'are philosophers opposed to the *Brachmanes*, and are contentious and fond of argument. They ridicule the *Brachmanes* who study physiology and astronomy as fools and impostors.' Strabo then proceeds to distinguish several classes of '*Pramnai*'.¹

¹ McCrindle, *Ancient India*, etc. (1901), p. 76.

Budhila's desire that *pramā* should not be taught to the Mahāsāṃghikas was given effect to by the official endorsement entered herein: *Khalulasa Khardaasa kshatravasa* of N-Q. It is clear that, when N-Q was engraved, the local satrap was Khalula Khardaa; the satrap Śudasa's rule had terminated in Mathura. Quite in harmony with this conclusion is the circumstance that Budhila, who appears simply as a *bhikshu* in section F pertaining to the period of Śudasa's rule in Mathura, appears in section N as *bhikshu* and *āchārya*, implying elevation in status.

The dispositions of sections P-O-R show their posteriority to sections N-Q; P-O-R being fitted into the marginal spaces kept blank by the engraver of N-Q. What is designated J' appears really to be a continuation of R. The disposition of section G leaves it open to us to place G after N-Q but before P-O-R-J'. Such placing will conform to a psychological link; for G, like P-O-R-J', records *pūjā* to enumerated entities.

Of P-O-R-J', P must be read before O, because P is to the right, while O is to the left, and the direction of Kharoshthi writing is from right to left. Thus, we read: (P) *sarvasa Sak(r)-astanasa puyae*; (O) *sarvabudhana puya dhamasa puya saghasa puya*. We can hardly take P independently of O—although P is engraved in bolder letters than O, and we have *puyae* in P but *puya* (thrice) in O; because the relatively small lettering as well as the omission of the three *e*'s can be explained as due to limitations of space, apparently in conformity with the intention to write P and O symmetrically on the two margins. The engraver of section R, which follows section O, was so hard pressed for space that he could not help engraving part of it on the chipped-off surface avoided by the engraver of N-Q even at the cost of symmetry; for, as shown above, the latter part of Q (*kshatravasa*) overflows practically to the front. The precedent so established seems to have influenced the engraver of R to put down the terminal part of his material on a chipped-off surface of the front—the part designated J'. Consequently, reading R-J' together, we get: *Takshilasa K(r)ochh(r)anasa Belaśamuśo*. And it may be rendered: 'Of K(r)ochh(r)ana Belaśamuś, native of Taxila'. We should not dissociate *Takshila* from *Taxila*, a Greek pronunciation of Skt. *Takshaśilā*; another Greek pronunciation, *Taxiala*, is preserved in Ptolemy (VII. 1. 45), and is reflected as *Takshaila* in another Kharoshthi epigraph (*Corpus*, p. 90). The group P-O-R-J' should thus be taken together, and translated thus:—

'In honour of all Śakrasthāna: Honour to all Buddhas!

Honour to Dharma! Honour to Saṃgha!'

'Of K(r)ochh(r)ana Belaśamuś, native of Taxila.'

Sak(r)astana is doubtless composed of *Sak(r)a* and *stana* (= Skt. *sthāna*); and, if any particular geographical area is

intended thereby, we should think primarily of Kamboja—Naulibi—Nagara—Taxila,—wherefrom the people responsible for these records came to Mathura. The fact that *puya* (Skt. *pūjā*) is accorded to **Sak(r)asthāna* along with the Buddhas, Dharma and Saṃgha would lead us to expect in the expression *Śak(r)asthāna* an allusion to a *sacred entity*. It seems to me that **Sak(r)asthāna* is equivalent to *Śakra-sthāna*, 'the region of Śakra', i.e. the area or areas where Śakra-worship prevailed. We may compare *Siva-thala* (Skt. *Śiva-thala*) occurring in the Panjar Inscription of 'the year 122' in the reign of *maharaja Gushana*.¹ The expression *sarvasa Sak(r)astanasa puyae* implies *pūjā* to the whole of Śakra-sthāna, that is, to all localities where Śakra or Indra was worshipped. Since the *pūjā* proceeds from a person pertaining to Taxila, it behoves us to enquire in the first instance whether Śakra was venerated there.

Strabo quotes Alexander's historians as the source of his statement: 'The Indians worship *Zeus Ombrios* (i.e. the Rainy); the river Ganges and the indigenous deities of the country.' Let us compare a passage occurring in the Kauṭīliya Arthaśāstra (IV. 3): *varshāvagrahe Śachinātha-Gaṅgā-parvata-Māhākachchha-pūjāh kārayet*, 'During drought, worship should be performed of Śachinātha (= Śakra, Indra), the Ganges, the mountains and Māhākachchha (= Varuṇa)'. It thus appears that Zeus Ombrios corresponds to Śakra or Indra in his drought-removing and rain-giving capacity. When therefore we find Strabo quoting Onesicritus as the source of his statement that two of the sages of Taxila—Kalanos and Mandanis—discoursed on Zeus when Onesicritus, as Alexander's representative, wanted to 'hear their wisdom', we may infer that the identity of Zeus with Śakra was well recognized and that Zeus was regarded with special veneration at Taxila as master of the world and dispenser of rewards and punishments. As the passage in Strabo is important for its bearing on my interpretation of *Sak(r)astana*, I take the liberty of quoting it in McCrindle's translation (*Ancient India*, 1901, pp. 70–75):

'.....Onesicritus found him [*scil.* Kalanos] at the time of his visit lying upon stones. He approached the sage and, having accosted him, informed him how he had been sent by the King [*scil.* Alexander] to hear their wisdom and bring him a report of its nature. So then, if there was no objection, he was ready to listen to his discourse. Kalanos, observing that he wore a mantle, a broad-brimmed cap and long boots, laughed and said: In former times the world was full of corn and barley, as it is now of dust; the fountains then flowed, some with water and others with milk, or it might be with honey or with wine and with oil; but mankind, by repletion and luxury, became

¹ *Corpus*, p. 69. Konow, after remarking 'what a *Siva-thala* is, I cannot say', proceeds to translate it as 'auspicious grounds'.

proud and insolent. Then Zeus, indignant at this state of things, made all disappear, and allotted to man a life of toil. When temperance, however, and other virtues had appeared once more in the world, an abundance of good things again arose.... .Mandanis' [who was, according to Strabo's sources, 'the oldest and wisest' of the sages of Taxila] 'is praised, because when messengers from Alexander invited him to go to the son of Zeus [scil. Alexander], with the promise of gifts if he complied, and threats of punishment if he refused, he did not go. Alexander, he said, was not the son of Zeus, for he was not so much as the master of the larger part of the world..... The following particulars also are stated by the historians. The Indians worship Zeus Ombrios (i.e. the Rainy), the river Ganges, and the indigenous deities of the country.'

Of the three other localities, besides Taxila, mentioned in the Lion-Capital Inscriptions, viz. Kamboja—Naūliba—Nagara, the last named (Nagara) bore, according to Ptolemy's geography, the alternative designation Dionysopolis, proving it to have been a centre of Dionysus-cult; and Dionysus was, as we know, a son of Zeus. Naūliba figures along with Proklais (Pushkalāvati) among the Gandarioi in Ptolemy. And Kamboja figures between Yonas (Greeks) and Gandhāras in one of Aśoka's inscriptions.

We have numismatic testimony to prove prevalence of Zeus-worship in regions around Kāpīśī and Pushkalāvati; coins of Eucratides present 'Zeus enthroned' as *Kaviśīye nagara-devata*, and coins of Azilises figure the 'standing Zeus' along with the 'city-goddess of Pushkalāvati'. In view of the early identification of the thundering Indra or Śakra with the thundering Zeus, it is of interest to note that Aśoka refers to thunder-cult being practised in an area contiguous to or comprised in the Greek settlements, the Kambojas and the Gandhāras; in one of his inscriptions we find reference to *Viśa-Vajri—Yona—Kamboja—Gandhara*, and *Viśa-Vajri* can hardly be dissociated from *Viśva-Vajra*—a double-headed variety of *Vajra*—worship of which is well attested for a later period. The Gandhāra sculptures always figure *Vajrapāṇi* as attending on Buddha; and, since Indra or Śakra is *Vajrapāṇi* ('thunder-bearing') *par excellence*, the representation of Buddha-cum-Vajrapāṇi can only be regarded as evolved from an originally dual divinity, like Mitra-Varuṇa, etc. of Vedic literature, composed of Buddha and Śakra (= Vajrapāṇi), with Śakra reduced to a subordinate position. Many such sculptures come from the Swāt valley where, according to Yuan Chwang, local legend related what Buddha had done 'when he was Śakra'. Associated with the source of the river Swāt (Su-po-fa-su-tu, 'Suvāstu') is another legend, also preserved by the Chinese pilgrim, which makes Buddha take the *Vajra* from Vajrapāṇi in order to bring to terms

the dragon-king who was afflicting people with rains and wind,—clearly a Buddhist edition of the Indra-Vritra myth.

There are coins of the so-called 'Nameless King', found almost exclusively at Mathura, which depict the thunder-bearing Zeus or Śakra on reverse; these show that even in the Mathura region there was a community devoted to the worship of Śakra or Zeus. The reverse-type closely resembles some coins struck by Azes as well as issues bearing the joint names of Azes and Spalirises found most plentifully in Kandahar and Seistan. Its ancestry can be traced back to Bactria. Coins of Bactrian Greeks figure Zeus hurling thunderbolt, with aegis on one arm as reverse-type. Diodotus (I or II) and Euthydemus I strike the type. Demetrius, on his bilingual silver clearly intended for Indian currency, varies the type by substituting the sceptre for the aegis, the god being represented as holding, instead of hurling, the thunderbolt. Heliocles follows Demetrius in his silver issues; and his Scythian conquerors mint the type in copper. Archebius presents the thunder-bearing Zeus in two poses: in one, the deity holds sceptre and hurls thunderbolt; in the other, he holds aegis and hurls thunderbolt; both being manifestly varieties of the representations of Zeus in the two series, Bactrian and Indian. Since Greek coin-types were local in character, it is reasonable to infer that these coins were meant specially for areas where worship of Zeus prevailed. The idea seems to have originated with Bactrian Greeks intent on conciliating Scythians who, as Herodotus (IV. 59) assures us, were in the habit of propitiating Zeus. It is interesting to observe that according to the same authority the Scythians regarded the Earth as the consort of Zeus—an idea akin to the Vedic concept *Dyāvā-Prithivī*, of which the first element (*Dyauh*) has been philologically identified with the name *Zeus*.

Concerning Taxila, we may observe that the local coin-type initiated by Antialcidas (whose rule over Taxila is epigraphically attested by the Besnagar inscription of his envoy Heliodorus) shows on *obv.* the 'Head of Zeus, holding sceptre' (really the king, posing as Zeus) and on *rev.* 'Palms and Pilei of Dioscuri', that is, the twin-sons of Zeus. The same reverse-type is employed by the Satrap *Liaka Kusulaka* whose name occurs on the Taxila copper-plate; and his son figures on the Lion-Capital itself as *Kusullaa Patika* in section G which was inserted, as we have seen, shortly before P-O-R-J'. It is likely that, when Patika removed from Taxila to Mathura, a part at least of his *entourage* accompanied him to his eastern seat of government; and *Takshila K(r)ochh(r)ana Belasamuś* (sections R-J') may have been a person belonging to the same *milieu*.

The name *K(r)ochh(r)ana Belasamuś* reminds us of *Belasamisa Gushanasa* in line 3 of the Takht-i-Bahai inscription incised in the year 103 of what is generally admitted to be the

(Vikrama) era of 58 B.C. (i.e. the year A.D. 46), being also the year 26 in the reign of Gondophernes. It is not impossible that the same person is intended. From the phonetic standpoint, *K(r)ochh(r)ana* might well correspond to the style we generally represent as 'Kushāna'; the word was, even on Kushān coins, variously spelt; *XOPANCY*, *ΚΟΡΓΟΛΟΥ*, *KOφANO*,—all these are found, and they betray the uncertainty felt in transcribing the second syllable in Greek or modified Greek. The vocalization in *K(r)o* corresponds to *X O-*, *K O-*, of the coins; that is to say, it may represent a Greek pronunciation of *K(r)u*, just as *Takshila* represents a Greek pronunciation of *Takshasīlā*. There is enough resemblance between *Belasamuśo* of Mathura and *Belasamisa* of Takht-i-Bahai to justify us in presuming phonetic identity; the name may perhaps be composed of Babylonian *Bel* and *Shamash*, where *Bel* means 'lord', 'master' (cf. art. 'Bel' in Encycl. Britt., 11th ed.) and *Shamash* is a god's name. We have already (*supra*, p. 17) noted correspondence between the name *Habani* (of section A herein) and *Habban*, an 'Indian' merchant figuring in the *Acts of St. Thomas* in association with Gondophernes. And it has been shown elsewhere¹ that the king reputed to have put St. Thomas to death was most probably *Mastāna* whose torso was found in the Kushān statue-house near Mathura and whose name can be reconstructed out of the Ethiopic versions of the *Acts*. *Mastāna* must have been a 'Kushān', since his statue was set up with that of Kanishka in the same statue-house, evidently for purposes of worship as implied in the term *devakulu* ('temple') applied to it in the foundation-record incised on the pedestal of another image labelled as *mahārājo rājātirājo devaputro Kushānaputro shāhi Vama-Takshamasya*.

If these links are considered together, we shall probably have to revise our notions regarding the manner in which Śakas were supplanted by Kushāns. A process of infiltration seems to have operated. We know from coins that Gondophernes succeeded to the Manes-Azilises-Azes group by associating himself with *Áspa-varmma*, the *strategos* of Azes; and Sasa, nephew of *Áspa*, afterwards struck coins under the new master. Quite possibly, when the Śaka empire in N. India was thus hastening to its end, its eastern provinces, hitherto ruled over by mahākshatrapas and kshatrapas, passed under Kushān administration as the result of a *coup d'état*. The fact that the Sarnath inscription dated in 'year 3' in the reign of Kanishka mentions local rulers bearing Scythian names with the titles *mahākshatrapa* and *kshatrapa* points to a bloodless revolution rather than a sanguinary conflict having ushered in Kushān rule over Eastern India.

¹ Deb, *JPASB*, 1933, pp. 311-2.

FIRST INSCRIPTION.

(H. H) dhamadana guhavihare viya[a]ka[dha][varo]

(M)

(I and J(1)-J(2))

- | | | |
|---------------------|---------------|-----------------------------|
| 1. kshatrave Śudise | 4. Veyaūdaka- | 8. kadhavaro Bubusapa |
| 2. imo paḍhravi | 5. ro kadha | 9. rvat(r)aparena palich- |
| 3. prat(r)eśo | 6. varo | chhina |
| | 7. viyaa | 10. nisimo karita niyat(r)- |
| | | it(r)o |

(J(3)) 11. Sarvastivat(r)ana parigrahe

(K-L) { 12. ayariasa
 13. Budhat(r)evasa
 14. ut(r)aena ayimita

TRANSLATION.

‘*Religious gift to the cave-monastery—the encampment of victory.*’

‘By kshatrava Śudisa, this piece of land—Veyaūdakara—the encampment of victory, limited in boundary by what is beyond the rock Bub(b)usa is made *nissima* (i.e. an appurtenance just outside the limit of the cave-monastery) (and) is granted for the acceptance of the Sarvāstivādins.’ •

• ‘Of the āchārya Budhat(r)eva. Received with water.’

SECOND INSCRIPTION.

(A)

1. mahakshatravasa Rajulasa
2. agramahesh(r)i Ayasia
3. Kamuia dhitr(a)
4. Kha(r)raostasa yuvaraṇa
5. mat(r)a Nada Diakasa [taye ?]
6. sadha mat(r)a Abuhola [e]
7. pit(r)amahi Pishpaś(r)ia bhra
8. tra Hayaūrana sadha Habanisa
9. astraūrena horakapa
10. rivarena iś(r)a praḍhraviprat(r)e
11. ś(r)e nisime śarira prat(r)iṭhavit(r)o
12. bhak(r)avat(r)o Sakamunisa Budhasa
13. [Maśa]kitri-rayasaśpae bhusarivita
14. thuva cha sagharama cha chat(r)u
15. diś(r)asa saghasa Sarva
16. stivat(r)ana parigrahe

(E(1)(2)(3)-E')		(B-D)	
17.	Kha(r)raosto yuvaraya	20.	mahakshatravasa
17a.	Kamuio	21.	Rajulasa putra
18.	Khalamasa kumara	22.	Śudase kshatrave
19.	Maja kaniṭha	22a.	Naūlube
		(C) {	19a. Kalui a
			19b. varajo
(E(4)-E')	23.	samanumot(r)ak(r)a karita	
(F)	{	24.	Budhilasa Nak(r)araasa
		25.	bhikhusa Sarvastivat(r)asa

TRANSLATION.

‘By Ayasi, chief queen of mahākshatrapa Rajula, native of Kamboja, daughter of *yuvarāja* Khar(r)aosta, mother of Nanda Diaka, (by her?), along with her mother Abūhola, her father’s mother Pispasri, her brother Hayaūara, along with the body of Star-observing Horakas (astrologers) of Habani, is established, in this piece of land made *nissima* (i.e. an appurtenance just outside the limit of the cave-monastery), the corporeal relic of the Lord Śākyamuni, also, for merit to the (? the three Maśaki) Kings, a *stūpa* imbedded in earth, also, a *saṃghārāma* for the Four Quarters of the Saṃgha—for the acceptance of the Sarvāstivādins.’

‘Khār(r)aosta, the *yuvarāja*, a native of Kamboja; Khalamasa, the *kumāra*; Maja, the *kanishṭha* (i.e. youngest of the brothers); [Kalui, the *avaraja* (i.e. born afterwards)—added with a caret];—made co-assenters by kshatrapa Śudasa, native of Naūliba, son of mahākshatrapa Rajula.’

‘Of Budhila, native of Nagara, a Sarvāstivādin *bhikshu*.’

THIRD INSCRIPTION.

(N-Q)

1. ayariasa Budhilasa Nak(r)arak(r)asa bhikhu
2. sa Sarvastivat(r)asa sag(r)a
3. re Mahasaghia na pra (ma)
4. ṇavit(r)ave Khalulasa
5. Khardaasa
6. kshatravasa

TRANSLATION.

‘According to the promise (*saṃgara*) of the *āchārya* Budhila, a Sarvāstivādin *bhikshu*, native of Nagara, correct apprehension (*pramā*) not to be taught to any Mahāsāṃghika.’

‘Of kshatrapa Khalula Khardaa.’

FOURTH INSCRIPTION.

(G)

1. mahakshatravasa Kusullaasa Patikasa Mevaki(sa)
Miyikasa kshatravasa puyae

TRANSLATION.

‘In honour of mahākshatrāpa Kusullāa Patika (and) of
kshatrāpa Mevaki Miyika.’

FIFTH INSCRIPTION.

(P-O-R-J')

1. sarvasa Sak(r)asta
2. nasa puyae
3. sarvabudhana puya dhamasa
4. puya saghasa puya
5. Takshilasa
6. K(r)ochh(r)anasa
7. Belaśamu
8. śo

TRANSLATION.

‘In honour of all Śakrasthāna! Honour to all Buddhas!
Honour to Dharma! Honour to Saṃgha!’
‘Of K(r)ochh(r)ana Belaśamuś, native of Taxila.’

REFERENCE.

For plates please refer *Corpus Inscriptionum Indicarum*, Vol. II,
Sten Konow, *Kharosthi Inscriptions*.

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A Note on a Unique work on Vedānta.

By CHINTAHARAN CHAKRAVARTI.

The Royal Asiatic Society of Bengal possesses a manuscript of a unique work on Vedānta called the *Saugata-sūtra-vyākhyānakārikā* and attributed to Kumārila Svāmin. A brief account of the work is given below with a view to drawing attention of scholars.

The manuscript which is hopelessly corrupt consists of 222 verses divided into three chapters, containing respectively 66, 81 and 75 verses. The origin and nature of the work is explained both in the beginning and the end.¹ But I am afraid, the explanation does not appear to be clear and helpful in appreciating the actual position. It refers to a Śivasūtra, composed in response to questions of Sugata, on which a commentary with a metrical summary as represented by the work under review was composed by Kumārila. The work is of the type of the *Upadeśasāhasrī* of Śaṅkara and contains a number of beautiful verses (I. 63, II. 47, 74).

It begins with an obeisance to Śiva.² The object of the work is stated to be an exposition of the real nature of Self and the refutation of Dualism.³ So, the definition of Self is discussed and views of other schools including those of the Vijñānavādins are refuted (I. 29). A eulogy of *knowledge* closes Chapter I.

Chapter II speaks of Pratyagātman, Māyā and the identity of Ātman, Brahman and Paramātman.

¹ शिवार्थं सुगतप्रश्नं शिवो व्याकृतवान् स्वयम् ।

शिवप्रश्नः स तत्सूत्रसारव्याख्यानमारभे ॥ I. 3.

प्रश्नं शिवार्थं सुगतस्य चक्रे यमुत्तरोक्त्या निहतं शिवोयम् ।

स वै शिवप्रश्न इति प्रसिद्धस्तत्सारस्तुत्रार्थनिरूपणोयम् ॥

शिवप्रसादेन विनिश्चितार्थः शिवोक्तस्तुत्रस्य विधाय भाष्यम् ।

इमाः सुसंक्षिप्ततदर्थकारिकाश्चकार सद्बुद्धिसुदे कुमारिलः ॥ III. 74-5.

² अवाङ्मनसगम्यस्य गुणातीतस्य वर्णनम् ।

गुणाध्यक्षतया यस्य सोऽनु[गृह्य]कृतु नः शिवः ॥ I. 2.

³ अथात्यन्तपुमर्थाग्नौ द्वैताभावप्रसिद्धये ।

आत्मकामस्य सद्बुद्ध्या आत्मतत्त्वं विविच्यते ॥ I. 20.

Chapter III discusses the nature of *Mokṣa*, praises monism, refutes dualism and incidentally refers to five mental states and three sources of knowledge (III. 21-22).

Of works, authors and schools of philosophy referred to in various connections mention may be made of Yogabhāṣya (I. 9), Bādarāyaṇa (I. 16), Sāṃkhya (I. 48), Bṛhadāraṇyaka (II. 6), Vyāsa (II. 39), Vyāsaśūtra (II. 40), Gautama, Akṣapāda and Kapila (III. 8-10), Karmamīmāṃsaka (III. 34) and Kāpila (III. 39).

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**Rāja Bīrbal—A Biographical Study, and an account
of his articles of worship.**

By B. PRASHAD.

Count von Noer¹ remarked 'of the many famous sovereigns of the East, few are comparable with Akbar and to him indisputably belongs the first place among the rulers of Hindustan. Not only was he equally great as a man, a warrior, and a statesman, but his reign fell at a time fitted to afford the freest play to his eminent qualities.' Beveridge² added his testimony to the above by stating 'The many-sided Akbar was a epitome of all the great Emperors, including Augustus, Trajan, Hadrian, Marcus Aurelius, Julian and Justinian.'

One of the great institutions of his august reign was the *Nau Ratana* (*Navaratna*) or the 'Nine Jewels'. These his 'nine friends', as Vincent Smith³ designated them, were Rāja Bīrbal or Bīrbal, Rāja Mān Singh, Rāja Tōdar Mal, Ḥakīm Ḥumām, Mullā Dūpiyāza, Faiḍī, Abūl Faḍl, Mīrza 'Abdur Raḥīm Khān Khānān and Tānsēn. The question has recently been discussed in an interesting contribution by Rao Bahadur G. S. Sardesai⁴ which was read at the Akbar Quarter-Centenary Celebrations at Bombay in 1942. In place of 'Abdur Raḥīm Khān Khānān he has substituted Bairām Khān, which is hardly correct, and he also includes Badā'oni in the list. *En passant* it may be noted that a very interesting painting of the *Navaratna* is exhibited in the Victoria Memorial Hall at Calcutta. Rāja Bīrbal was one of the brightest jewels of this august assemblage, and his tragic death in 993 A.H. (February, 1586) in the 30th year of the reign cast a gloom over the Court. On hearing of the death the Emperor did not take any food or drink for two days, and is reported to have remarked 'Alas! they could not even get his body out of the pass, that it might have been burned.'⁵ A court mourning was ordered, and later a second mourning⁶ was observed when an impostor's story of Bīrbal being alive proved without foundation.

¹ Fredrick Augustus Count of Noer, *The Emperor Akbar*, translated by A. S. Beveridge (Calcutta, 1890) I, Preface, p. 1.

² Beveridge, H. in *Tūzūk-i-Jahāngīrī*, translated by A. Rogers, edited by Beveridge, H., (London, 1914), II, Preface, p. 1.

³ Vincent, A. Smith, *Akbar The Great Mogul*, (Oxford, 1919), p. 359, note.

⁴ Sardesai, G. A., *Modern Review* for August, 1943, pp. 129-133.

⁵ *Muntakhab-ut-Tawārīkh* II, translation by Lowe (Calcutta, 1924), p. 164.

⁶ *Op. cit.*, p. 369.

Birbal's personality has unfortunately been greatly maligned at the hands of the contemporary historians. They all appear to have been extremely jealous of the very great influence which he had over the Emperor, but even so the most bigoted of them and one who probably hated him the most, Mullā 'Abdul Qādir Badā'onī could not but recognize his great merits, for he says :

ادراک بلند داشت i.e. he had a considerable amount of capacity and genius—and in regard to his influence over the Emperor he added 'it became a case of "Thy flesh is my flesh and thy blood my blood"' (لحمک لحمی و دمک دمی بوده).

Surely such a position of trust and regard with an exceptionally shrewd, clever, and talented ruler, such as Akbar, would have been impossible unless it is admitted that Birbal must have been a remarkably clever, capable, accomplished and loyal officer. Vincent Smith and tradition ascribe to him the extraordinary faculty of divining his master's secrets.

Our sources of information in regard to Birbal's earlier life are extremely limited, and even for the period of his service under Emperor Akbar one has to build up from stray references in the three contemporary histories, Abūl Faḍl 'Allāmī's *Akbarnāma*, Khwāja Nizām-ud-Dīn Aḥmad Bakhshī's *Tabaqāt-i-Akbarī* and Mullā 'Abdul Qādir Badā'onī's *Muntakhab-ut-Tawārīkh*.¹ Shaikh Illādād Faiḍī Sirhindī's *Akbarnāma*, Mullā 'Abdul Bāqī Nihāvandī's *Maāthir-i-Rahīmī*², and Firishtah or Muḥammad Qāsim Hindūshāh Astrābādī's *Tārīkh-i-Firishtah* or *Gulshan-i-Ibrāhīmī* do not contain any additional information. This is not strange in view of the fact that the authors of all these works relied mainly on the *Tabaqāt-i-Akbarī* for their accounts of Akbar's reign. From amongst the biographical works dealing with the period I have consulted the monumental book on Mughal Peerage *Maāthir-ul-Umarā*³ by Šamsām-ud-Daulah Shāh Nawāz Khan, completed by his son 'Abdul Ḥayy, *Tadhkirat-ul-Umarā*⁴ by Kēwal Rām, and *Darbār-i-Akbarī*⁵ by Maulānā Muḥammad Ḥusain Āzād. The account in *Maāthir-ul-Umarā* is a tolerably good summary of the information available in the contemporary histories of the period, and has formed the basis

¹ *Muntakhab-ut-Tawārīkh*, text II, p. 161 (Calcutta, 1865).

² For these works see Prashad, Preface to *Tabaqāt-i-Akbarī* translation III, pt. ii, pp. xxxiii-xxxv (Calcutta, 1939).

³ See Prashad's Preface to the English translation I (Calcutta, 1941) pp. 1, 2 for details of the text edition of this important publication. Birbal's biography is printed on pp. 118-122 of Vol. II of the text, and Beveridge's translation I, pp. 420-423.

⁴ See Ivanow, V. *Descriptive Cat. Persian Manuscripts in colln. As. Soc. Bengal* (Calcutta, 1924), pp. 71, 72, No. 216, for the MS in the Society's collection and references in regard to the work.

⁵ Muḥammad Ḥusain Āzād, *Darbār-i-Akbarī* (Lahore, 1939, Urdu), pp. 295-310.

of the accounts of most later authors. Muḥammad Ḥusain Āzād also notes that he tried to obtain further information about Birbal and his literary work from other sources, but without success. Blochmann's¹ account in his admirable translation of the first volume of *Ā'in-i-Akbarī* is based on *Maāthir-ul-Umarā* with some additional notes, but it unfortunately does not add to our knowledge of the life or achievements of Birbal.

A really important contribution on the subject, however, was the work of Grierson² (later Sir George Grierson) entitled *The Modern Vernacular Literature of Hindustan* published in the *Journal of the Asiatic Society of Bengal* in 1889, in which he collected most valuable information regarding the Hindi literature, particularly the works of poets, bards, etc. In this work he was able to include notes about Birbal's life based on Todd's *Rājasthān* and Sib Singh Segar's *Sib Singh Saroj*,³ an important anthology of the Hindi poets about whom very little information was hitherto available. This formed the basis of Vincent Smith's⁴ account of Birbal in his biographical work *Akbar the Great Mogul*. The interesting pamphlet entitled *Mullā Dūpiyāza and Rāja Bīrbal* (Birbal) by Muḥammad Tāhir⁵ in Urdu is an interesting account of these noblemen, but the details about Birbal's life, such as his early years, education at Lucknow, Lahore, etc. though stated to be based mainly on *Muntakhab-ul-Tawārīkh*, are not confirmed by any historical work. His identification of Mullā Dūpiyāza with 'Abdul Qādir Badā'oni is at variance with Pāiramall⁶ who identified him with a Mullā of Persian descent. A few useful notes on Birbal have also been published by Varaj Ratan Das in his Hindi translation of the *Maāthir-ul-Umarā*⁷ in the volume dealing with the Hindū officials, and in *Umrā'ī Hunūd* by Sa'id Aḥmad.

I give below a brief outline of the life of this great Hindū diplomat of Akbar's reign based on the information in the above sources.

¹ Blochmann, H., *Ā'in-i-Akbarī* I (translation, 2nd Ed., Calcutta, 1939), pp. 442-444.

² Grierson, G. A., *Journal As. Soc. Bengal*, LVII, for 1888, pt. I, pp. i-xxx, 1-170, i-xxxv (1889). Birbal's account is on pp. 35, 36, No. 106.

³ Sib Singh Sēgar, *Sib Singh Saroj*, pp. 454, 455 (3rd edn. Newal Kishore Press, Lucknow, 1883).

⁴ *Op. cit.*, pp. 236, 237.

⁵ *Mullā Dūpiyāza and Rāja Bīrbal* (The name is Birbal all through the text) in Urdu, pp. 1-48 (Delhi, 1927). For a detailed account of Mullā Dūpiyāza Professor H. Mahmud Shirani's learned article in *Oriental College Magazine* for November 1939 may be consulted. I am indebted to Prof. M. M. Haq for this reference.

⁶ Pāiramall, *Modern Review*, Vol. VIII, pp. 86-89 (1910).

⁷ Varaj Ratan Das's Hindi translation of *Maāthir-ul-Umarā* I, (Hindū Nobles), pp. 242-250 (Benares, 1931), *Umrā'ī Hunūd*, pp. 126-139 (Aurangabad, 1932).

His real name was Mahēs Dās, but in his earlier days he apparently preferred to it his *nom-de-plume* Brahm Dat (not Brahma Das as given by Badā'oni¹, or Brahna Das as was incorrectly copied by some ignorant or bigoted scribes of the *Muntakhab-ut-Tawārīkh*). In some works Brahm Kabi² is also given as his name, but this does not appear to be correct as he received the title of Kabi Rāy from Emperor Akbar at a later date. His father's name was Gangā Das³, and according to Sib Singh Segar⁴ and Bhūkhan Tripāthī⁵ (Bhushan Kabi of Chhatar Sāl) of Tikāmpūr (Tikmāpūr) in the Kānpūr (Cawnpore) district he was born in *Vikrami* sambat 1585 (1528 A.D.). The latter author also gives Tikāmpūr as the place of his birth. Sib Singh Saroj states that his ancestral place was some village in Hamirpūr District in the Allāhābād division. In view of these positive statements it is incorrect to describe him as a native of Kālpī, as most authors have done. Grierson describes him as a Kanaujiya⁶ Dube Brahman, while Varaj Ratan Das designates him as a Kanykubja—(a more correct Sanskrit form of Kanaujiya or Qannaujiya as it should be if the Persian orthography is followed). The details of his early life in Muḥammad Tāhir's work are, as already noted, not to be found in any historical work. It is essential to direct attention here to an unfortunate error on the part of the Muḥammadan historians and which has been copied in some of the later historical works in English. It is stated that he was a *Bhāt* by caste, and that he was a *Bād̄farōsh*. The epithet *Bhāt* in the case of Birbal was

¹ *Muntakhab-ut-Tawārīkh*, text II, p. 161, Lowe's translation II, p. 164. برهنه داس is written wrongly as برهنه داس or the Naked Das which is absurd. Lowe has, in my opinion, incorrectly regarded Badā'oni's epithet گداپی as a part of the name; this was only an invective used by the author out of scorn for Birbal; it only means a poor man, a mendicant or a dervish and cannot be regarded as a part of his name. Similarly his supposed *nom-de-plume* Baramba with the variant Burhiya noted by Beveridge (*loc. cit.*, p. 423) are only copyists' errors for Brahma. See also De's translation of *Tabaqāt-i-Akbarī* II (1936), p. 398, note 2, where a variant from another MS. has almost the same names and descriptions as in *Muntakhab-ut-Tawārīkh*; this was apparently the work of Bādā'oni who was one of the collaborators of Nizām-ud-Dīn Ahmad in the compilation of the *Tabaqāt*, see Prashad, *op. cit.*, p. xviii.

² See Grierson, *Journal As. Soc. Bengal*, LVII, Pt. 2, Special Number for 1888, p. 35.

³ This name is given in the inscription on Aśoka's pillar at Allāhābād, vide Varaj Ratan Das's Hindi translation of *Maāthir-ul-Umarā*, I (Hindū Nobles), p. 244, footnote (1931).

⁴ Vide Grierson, *op. cit.*, p. 128, No. 595.

⁵ Vide Varaj Ratan Das, *loc. cit.* He is the same as No. 145, p. 61 of Grierson's work.

⁶ See Beame's edition of Elliot's *Memoirs on the History etc. of the North Western Provinces of India* (1869), I, pp. 146–153, and Bhattacharya, *Hindu Castes and Sects* (1896), pp. 49–51 and for *Bhats*, pp. 114, 115.

apparently used to signify his profession of a bard, a poet, and a genealogist, and not to indicate his caste. In any case, as has been remarked by Malcolm¹ and Bhattacharyya, the *Bhāts* were in spite of their poverty 'the *tiers-etat* in Rajasthan, and the privilege of commenting on the action of their kings, which they possessed and very often abused, was nearly unlimited'. Similarly *Bādfarōsh* should be translated as a *Kabī* or a bard, and not a sycophant or a flatterer, as is implied in the most English translations. According to Badā'oni² he was at first in the service of Rāja Rām Chand of Bhatta, now known as the Rēwah State in Baghēlkhand. A reference may also be included to a legend current in Rēwah State: 'The³ village of Ghoghra (24° 33' N., 82° 5' E.), 18 miles west of Sihāwal, in the *Ilāka* of *Kanpura*, is traditionally connected with Birbal, Akbar's witty favourite. The story runs that in a small temple here dedicated to Chandī Devī, one Raghubīr Rām, Brāhman of Chandainia village, daily worshipped the goddess for twelve years. He was helped by his sister's son Birbal, in keeping the temple clean. One day while the boy was sweeping the temple and Raghubīr Rām was away, he accidentally hurt his little finger and the blood from it stained the goddess's image. This propitiated the goddess and she promised the boy that whatever he prophesied, would turn out right. On leaving the temple the boy met a Kewat fishing. He told the Kewat that a bird was entangled in his hook and drawing up the line a bird was actually found upon it. The same night the goddess appeared to the boy in a dream and told that instead of wasting his power in such follies he should go to the Emperor's court. Accordingly the boy went to Akbar's court, where he soon rose to honour and distinction. Apart from the legend it would appear that Birbal was at one time an attendant at the Baghēl Chief Rām Chandra's

¹ Malcolm, *Central India*, II, pp. 113, 114. The quotation is from Bhattacharyya, *op. cit.*, p. 115. Also see Wilson, *Glossary of Judicial and Revenue Terms*, pp. 78, 79 (London, 1855).

² *Muntakhab-ut-Tawārīkh*, text II, p. 335, Lowe's translation II, p. 345. De in the translation of the *Ṭabaqāt-i-Akbarī* II (1936), p. 595 has a long note (No. 3) about Bhatta, which he calls 'the country of Bhatt' and has given references to various readings and works. He was unable to trace the corresponding reference in *Akbarnāma*. The references are text III, pp. 420, 427 and Beveridge's translation III, pp. 624, 636. Blochmann (*op. cit.*, p. 685) identified Bhatta or as he writes Bhath as Panna, and following him Beveridge in his translations of the second and third volumes of *Akbarnāma* has designated Rāja Rām Chand as the Rāja of Panna State in Bundēlkhand, but the territory is what is now known as Rēwah State in Baghēlkhand, Central India, see C. E. Luard, *Rewah State Gazetteer* (Central India State Gazetteer Series IV, Lucknow, 1907), p. 1. He gives the name of Rāja as Rām Chandra, who ruled from 1555-92, and has included his detailed account on pp. 14-16. For Rām Chand Baghēlah also see *Maāthir-ul-Umarā*, text II, pp. 134-138, and for Baghēlah or Baghel Wilson, *op. cit.*, p. 45.

³ C. A. Luard, *op. cit.*, p. 82.

court.' Later, according to Todd¹ he was one of the Court poets of Rāja Bhagwān Dās of Amber or Jaipūr, and this Rāja gave him as a *nazar* (a present) to Emperor Akbar shortly after the latter's accession. Sib Singh Saroj² also mentions this in his biography. No reference to this transaction, if it may be called as such, is made in *Akbarnāma*, *Tabaqāt-i-Akbarī* or *Muntakhab-ut-Tawārīkh*, but relying on Todd's statement, apparently based on his personal enquiries in Jaipūr, the date of his introduction into Akbar's Court cannot be placed earlier than February, 1562, when Rāja Bihār Mal with his son Rāja Bhagwān Dās and grandson Rāja Mān Singh first came to Akbar's Court near Ajmer, and the Emperor was married to Rāja Bihār Mal's daughter at Sambhar³. Grierson, apparently on the authority of Sib Singh Segar, states that at this time he used to sign himself as Brahm Kabi in his poems. But according to the *Tabaqāt-i-Akbarī*⁴ he was first given the title of Kabi Rāy, and later of Rāja Bīrbār (the Hindī meaning of this title are detailed there at length as *Bīr* meaning a brave or hero, and *bar* great, i.e., the Rāja who is brave and great) when Nagarkot was bestowed on him by Emperor Akbar as his *jāgīr* in 980 A.H.⁵ (1572-73 A.D.). Blochmann, Āzād and Vincent Smith all state that he probably never enjoyed this *jāgīr* of Nagarkot, but in the account of the 26th year's reign in *Akbarnāma* it is recorded that he welcomed the Emperor and offered his tribute at Dasūha⁶, in the Nagarkot territory, which was in fief.

Prior to this in the 14th year he already must have been a man of some influence at the Court, for he introduced to the Emperor the Ambassador or Kajli (Cochin?) who had been waiting from some time to offer as a tribute a wonderful knife on behalf of his master.⁷

In the 17th year⁸ he was sent with other officers to the Panjāb to safeguard against the threat of an invasion by Ḥakim

¹ Todd's *Rajasthan*, II, p. 390 (Calcutta edn. 1877-79).

² *Op. cit.*, p. 455.

³ *Akbarnāma*, text II, pp. 157, 158, Beveridge's translation II, pp. 243, 244.

⁴ *Tabaqāt-i-Akbarī*, II, De's translation, p. 399.

⁵ Nagarkōt, according to *Akbarnāma*, text II, p. 370, Beveridge's translation II, p. 538, was assigned to Bīrbāl in the 17th year, but Nagarkōt was not conquered till the following year, and even then only a hurried peace had to be arranged by Ḥusain Qulī Khān owing to the impending attack of the Punjab by Ibrāhīm Ḥusain Mirzā, see *Akbarnāma*, text III, pp. 36, 37, Beveridge's translation III, pp. 51, 52.

⁶ *Akbarnāma*, text III, p. 348, Beveridge's translation III, p. 511. It is Dasuya in the Hoshiarpur District of the *Imperial Gazetteer*.

⁷ *Akbarnāma*, text II, p. 342, Beveridge's translation III, p. 500. The knife referred to was probably made of Narhwal ivory, see Rogers and Beveridge's translation of *Tūzūk-i-Jahāngīrī*, II, p. 300 for its supposed properties, etc.

⁸ *Akbarnāma*, text II, p. 370, Beveridge's translation II, p. 511.

Mirzā. In the 18th year¹ he accompanied the Emperor on his famous invasion of Gujarāt, and in the 19th year² he was with him in the expedition to Bihār. In the 30th year³ he was deputed to the Yūsufzā'i campaign. The choice of the command lay between Bīrbal and Abūl Faḍl and the question was decided by lot. Even then Akbar was reluctant about allowing Bīrbal to proceed on this campaign, but on the latter's insistence he sent him with a large army. The absence of a unified command, the inexperience and petty mutual jealousies of the commanders and finally the haphazard way in which the expedition was carried out resulted in a disastrous defeat for the imperial armies while crossing the Karākar and Malandārī passes, and it was here that Rāja Bīrbal and nearly 8000 of the army were massacred by the Afghāns.

In the 21st year⁴ Bīrbal was sent to Dūngarpūr to arrange about the marriage of the daughter of the Rāja with Emperor Akbar. In the 23rd year⁵ he was deputed with Saiyid Muzaffar to Jālandhar (Jullundher) to supervise the removal of the Afghāns from the Panjāb to other areas. In the 25th⁶ year Rāja Bīrbal and Shāh Qulī Maḥram were sent to conciliate Mā'sūm Khān Farrankhūdī who had rebelled at Jaunpūr. In the 28th year⁷ he was deputed with Zain Khān Kōka for bringing Rāja Rām Chand Baghēla of Rēwah to the Court.

Bīrbal, however, spent most of the time at the Court in close attendance on the Emperor, and according to local tradition was with Khān Khānān, Abūl Faḍl and Faḍlī one of the four ministers who were favoured with attendance round the famous throne-pillar at Fatehpūr⁸ Sikrī. He was constantly consulted by the Emperor, and one special occasion was in the 27th year⁹ when the Emperor asked the advice of all his leading ministers for improving the administration in the country. Bīrbal's suggestion, which was very judicious and humane was that 'some right-minded and energetic men should act as inspectors in various places and should represent impartially the condition of the oppressed people and seekers after justice and report unavoidable calamities.' In the same year¹⁰ when various leading officials were appointed to supervise sales of different

¹ *Akbarnāma*, text III, p. 49, Beveridge's translation III, p. 69.

² *Op. cit.*, text, p. 87, translation, p. 123.

³ *Op. cit.*, text, p. 478, translation, pp. 719, 720. For good accounts of the Yūsufzā'i campaign see Raverty, *Notes on Afghanistan* (London, 1888), pp. 259-265, and Vincent Smith, *op. cit.*, pp. 232-236. Sardesai is wrong in stating that Bīrbal was killed in the Kashmir campaign.

⁴ *Op. cit.*, text, p. 196, translation, p. 278.

⁵ *Op. cit.*, text, p. 248, translation, p. 357.

⁶ *Op. cit.*, text, p. 330, translation, p. 484.

⁷ *Op. cit.*, text, p. 420, translation, p. 624.

⁸ Vincent Smith, *op. cit.*, p. 444.

⁹ *Akbarnāma*, text III, p. 380, Beveridge's translation III, p. 559.

¹⁰ *Op. cit.*, text, p. 396, translation, p. 585.

commodities on a commission basis, Birbal was appointed in charge of the sale of cattle and buffaloes; the officers were to receive $\frac{1}{2}\%$ from the purchasers and 1% from the sellers, and the $\frac{1}{2}\%$ was to be their share. In the 28th year¹ he in company with Abūl Faḍl, Qāsim 'Alī Khān, Hakīm Humām and Shamshēr Khān Kōtwāl was appointed to 'the administering of justice to complainants'. They were not only to be 'satisfied with witnesses and oaths, but make a profound investigation'. In fact this body was established as a final appellate Court of the realm on the lines of the present day Federal Court of India. In view of the above appointments Vincent Smith's conclusion that 'he is not recorded as having held any important office' is hardly justified.

The regard which the Emperor had for him is further borne out by the fact that he had a beautiful house built for him at Fathpūr Sikrī in the 27th year², and the Emperor twice attended at his house special feasts which Birbal arranged in his honour in the 27th³ and 29th⁴ years. In the 29th⁵ year the Emperor even at the risk of his own life saved him from being crushed by an elephant which had run amok. The Emperor also went to his house⁶ in the village Akbarpūr Birbal⁷, which Birbal had founded on the banks of the Jamnā some 30 miles north of Cawnpur, in the 28th year. This village was in his *jāgīr* in the Kālīnjar Sarkār⁸ mentioned by Badā'onī, and whence the false report of Birbal having been seen after his death was received at the Court. Finally a reference may be included here to the identification⁹ of Salimgarh in the Agra Fort as the *bāradārī* of Birbal on the authority of some native historians who have not yet been identified.

In the above account I have not considered it necessary to refer to the religious discussions and wrangles in which he

¹ *Op. cit.*, text, p. 405, translation, p. 599.

² *Op. cit.*, text, p. 397, translation, p. 587. For a photograph of the house see Vincent Smith, *op. cit.*, p. 443 and the plate facing the page, and Percy Brown *Cambridge History of India*, IV, pp. 542, 543.

³ *Op. cit.*, text, p. 397, translation, p. 587; also see Muḥammad Ḥusain Āzād, *op. cit.*, pp. 296, 297.

⁴ *Op. cit.*, text, p. 438, translation, p. 657.

⁵ *Op. cit.*, text, p. 436, translation, p. 654.

⁶ *Op. cit.*, text, p. 415, translation, p. 617.

⁷ F. N. Wright, *Statistical, Descriptive and Historical Account of the North-Western Provinces of India*, VI, p. 203 (Allahabad, 1881). Grierson notes that his descendants still exist in the Nārnaul quarter of the town (*op. cit.*, p. 36) and Sib Singh Segar (*op. cit.*, p. 455) records that the remains of beautiful buildings erected by him are all still to be found there, and that he founded the place at the instance of the Emperor.

⁸ See Badā'onī, *Muntakhab-ut-Tawārikh*, text II, pp. 357, 358, Lowe's translation II, p. 369.

⁹ *North-Western Provinces Gazetteer*, VII, p. 690 (Allahabad, 1884) and Nur Bakhsh in *Annual Report Arch. Surv. Ind.* for 1903-04, p. 169 (Calcutta, 1906).

was often involved with Badā'oni and other Muhammadan ecclesiasts; these are recorded in second and third volumes of the *Muntakhab-ut-Tawārīkh*. Nor have I discussed his *bon mots*, jokes, parables and short stories which are still current in almost all parts of Northern India. All these are of no historical interest. Birbal it may be noted was a *Kabī* of no mean order, a skilled musician, and was well known for his liberality and good nature.

Two of his sons Lālā and Har Rāy held minor offices during Akbar's time, but none of them rose to any high rank.

From the above it is clear that Birbal was not merely a story-teller, and a conversationalist whom only his *bon mots* made a favourite with Emperor Akbar. He was an officer of the rank of 2000 horse ¹, and besides being attached to various military expeditions was often sent on diplomatic missions of great importance. He was certainly an exception amongst all grandees of Akbar's Court in not having been admonished for any shortcomings on any occasion whatsoever. He was the only Hindu member of Akbar's universal religion *Dīn-i-Ilāhī* ². It would be wrong to assert that he became a convert to this new religion simply to please the Emperor, rather it is suggested that he was fully satisfied about the soundness of its principles. In this connection it should not be forgotten that as a Brahman he was a devout Hindu as is evidenced by his articles of worship which have now come to light, and his pilgrimage to Allāhābād in 1576, while in the earlier years of the reign he was instrumental in making the Emperor take to Sun worship ³. In Akbar's regime he held a very high place being connected with the commerce department and the administration of justice. He would certainly have risen much higher but for his untimely death in the Yūsufzā'i campaign.

As an appendix to the above account I propose to include here a short description of certain articles of worship of Rāja Birbal. These articles were recently acquired by my friend Rai Bahadur Radha Krishna Jalan of Patna City from a hoard in the possession of an old family now fallen on evil days in the United Provinces. I wish here to express my sincere thanks and gratitude to him for giving me an opportunity of examining and describing this valuable find.

These articles of worship are made of solid silver inlaid with gold and copper and are excellent examples of high class Bidri work. Leaving aside the intrinsic value of gold and silver their importance lies not only in the fact that they are excellent

¹ *Ṭabaqāt-i-Akbarī*, II, De's translation, p. 674. Sib Singh Saroj, *loc. cit.*, p. 445, is incorrect in stating that he had attained the rank of 5,000.

² For a critical account see Vincent Smith, *op. cit.*, pp. 209-422.

³ See Badā'oni *Muntakhab-ut-Tawārīkh*, text II, pp. 260, 261, Lowe's translation II, p. 268.

dated specimens of Bidri-ware, nearly 400 years old, but also because they bear the name of the owner and the dates on which he acquired them, in both the Vikrimī *śamat* and the Salivāhan *śāke*. They also enable us to judge the social and material position of their owner, Rāja Bīrbal, at the time noted in the inscription.

The *pancha-pātra* (Figs. 3, 4) or the flat-bottomed basin for water used in the course of the ablutions is $3\frac{3}{4}$ inches high; and $3\frac{1}{4}$ inches in diameter. The presence of shallow depressions in the centre of its bottom seems to indicate that it was made on some type of a turning wheel or lathe, and this is confirmed by its very regular outline and shape. It has an outwardly projecting rim about half-an-inch broad along its upper edge. Both the rim and the outer surface of the basin are worked in Bidri style, and the main motive is the *Kalika* or conventionalized mango design with a branch of leaves filling up the central space. Above and below this motive are a row of heart-shaped petals with two rows of ovoidal leaf-like figures on either side. The spaces between the 8 main *Kalikas* are filled in by well-chased gold leaves. The outlines of the *Kalikas*, about $\frac{1}{8}$ of an inch broad, are in gold and so are the heart-shaped motives, while the foliage and smaller leaves are of copper. The motive on the rim consists of very regularly laid out ovoidal leaves in a single row, in gold, filling up almost the entire surface.

The *tāmra-kunda* (Figs. 5, 6) or the flat-bottomed plate is $7\frac{5}{8}$ inches in maximum diameter at the top and has a diameter of $5\frac{3}{8}$ inches at the bottom; it is about an inch deep. The motive of the *pancha-pātra* is repeated on this plate, except that there is a circular stellar design in the centre surrounded by a circle of 8 *Kalika* designs. The heart-shaped gold bits on the rim are, owing to their small size, not so well executed as those on the rim of the *pancha-pātra*.

Both these vessels bear the inscriptions 'Shrīmān Mahārāj Brahm Dat, *śamat* 1608, *śāke* 1473' reproduced in photographs 4 and 6 respectively. The date according to the Christian era would be 1551 A.D. about 11 years before Bīrbal's introduction to Emperor Akbar's Court.

The *Āchamanī* (Fig. 7) or the spoon used in the course of ablutions is about 5 inches long. The spoon end, which is slightly, less than an inch in diameter, is not quite circular but octagonal, and bears 8 low ridges on its inner surface, and at the bottom has a solar design in gold. The handle is fluted above and there is a bird figure on either side where it is joined to the spoon-end. The other end of the handle has an image of the god *Ganeśa* with a five-headed hooded cobra forming an umbrella over the image. In Madam Getty's¹ excellent monograph

¹ Alice Getty, *Ganeśa, A Monograph on the Elephant-faced God* (Oxford, 1936).

on *Gaṇeśa* I have not found any figure corresponding to this representation of *Gaṇeśa*. It may be noted that though gold chasing in three rows is to be found on the stem, no gold inlay has been used on the figures of *Gaṇeśa* or of the cobra.

The last item, the most interesting of the list, is a standing image of *Nṛitya-Gopāla* (Fig. 1) fitted on a beautifully executed pedestal, and a *prabhāvali* fixed by struts behind it. The pedestal (Fig. 2) underneath bears an inscription similar to those on the other vessels except for the dates, both *samat* and *śāke*, which are six years later, viz. 1614 and 1479 respectively.

The pedestal is roughly 4 inches square, and about 2 inches high with a grooved-in space in which the image is slipped in from behind, and two rectangular slots for the fitting in of the *prabhāvali* on the sides. The pedestal is ornamented with a row of inverted heart-shaped golden petals joined together by regular arcs connected with one another on the outer bases. The same design is repeated over the hollow groove for the reception of the image, while the flange next to it bears a single row of stellar petals. The main bevelled surface is ornamented with a beautifully executed foliage design in gold. It is interesting to note here that the *Kalika* design is not used in the ornamentation of the pedestal or the image.

The *prabhāvali* stands some 6 inches high with the struts about an inch long fitted into the pedestal. It is an ornamented ring, somewhat ovoidal in outline with a maximum breadth of about 5 inches, and represents a halo of flames (*javālās*) shown in conventional curls round the periphery. The flames or *javālās* are executed in gold, while the central ovoidal pivot about $\frac{3}{4}$ inch in height bears a stellar design in gold.

The image of *Nṛitya-Gopāla* is some 3 inches in height and is standing on a *padma-pīṭha* or the conventional lotus flower base about $1\frac{1}{4}$ inch in diameter. It is an image of the young *Kṛiṣṇa* in the dancing attitude resembling in general the *Navanīta-nṛityamūrti* bronze figured by Rao¹. The right foot is made to rest on a *śaṅkha* to provide better attachment to the pedestal, and the hands are held in a *Kaṭaka-hasta* or pose. There is no *makūṭa* on the head and the hair are coiled into a prominent knot behind the head in the characteristic South-Indian style. The ears are large and bored in the lower lobe; they are supported by a broad lapel connected with the shoulders somewhat similar to the type reproduced in Madam Getty's figure of *Bāla-Kṛiṣṇa*.² It is a nude figure, but is embellished with ornaments, such as a necklace with an amulet in the centre worked in gold, a waist-band, bangles round the wrists, and anklets on the legs and the feet.

¹ T. A. Gopinath Rao, *Elements of Hindu Iconography* I, pt. i, p. 206, pl. lx, fig. 1 (Madras, 1914).

² Alice Getty, *op. cit.*, pl. xv, fig. 6.

These articles are of a polished chocolate brown or bronze colour which appears to be due partly to oxidation during the process of manufacture, and partly to their age. These articles of worship with the name Brahm Dat inscribed on them, and the dates 1608 and 1614 *samat*, eleven and five years earlier than his introduction to Emperor Akbar's Court, indicate that Bīrbal at the time must have been a man of position and means, and not a mere nobody. Unfortunately very little information is available regarding the exact history of these vessels, and one must add a word of caution regarding the possibility of their being fakes, though in view of their historical value not having been realized at the time of their sale, this is hardly likely.

I have to express my great indebtedness to Rao Bahadur K. N. Dikshit, the late Director-General of Archaeology in India, for his expert advice in reference to these articles of worship and for lending me several books from his departmental library.

EXPLANATION OF PLATE.

All the figures are direct reduced photographs of the articles of worship of Rāja Bīrbal.

Fig. 1. The image with the pedestal and the *prabhāvali*. Front view.

Fig. 2. Pedestal from below showing the inscription of the name of the *guru* and the date.

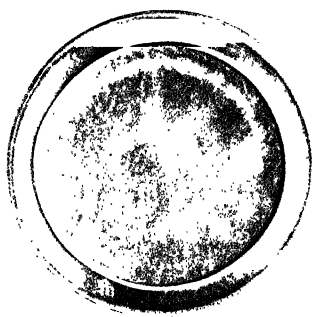
Figs. 3, 4. Side view and base of the *pancha-pātra*.

Figs. 5, 6. Upper and lower views of the *tāmra-kunda*.

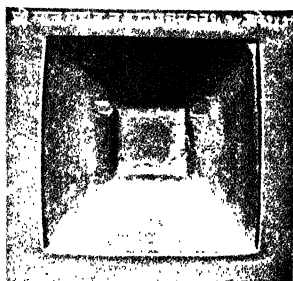
Fig. 7. *Achamanī* seen from above.

Paper received—13-9-1943.

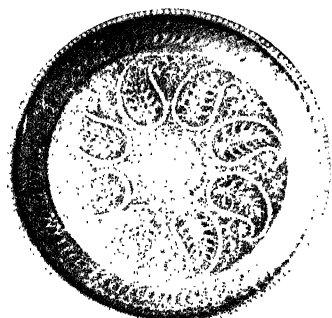
Paper published—12-7-1944.



6.



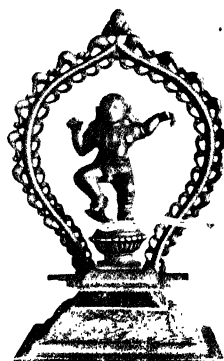
2.



5.



7.



1.



4.



3.

Articles of Worship of Rāja Birbal.

**A New Discovery referring to Marco Polo's Departure
from China from the Chinese Source.**

YANG CHIH-CHIU.

(Communicated by Dr. Kalidas Nag.)

Much has been done to the solution of the many puzzled questions in the book of Marco Polo. The identification of places, the interpretation of strange terms and the illustration of obscure customs, all these have been largely worked out by the laborious researches of the lovers of this traveller. Little, indeed, has been left unexplained about the numerous statements which Marco gives in his book and which may seem curious and incomprehensible at first sight.

There remains still, however, a great deal of puzzles about the circumstances of our traveller's personal history. Marco resided in China for a long time; no one nowadays doubts this fundamental fact; but none, alas! has been able to find any mention of him from Chinese sources of information. Pauthier's assertion, supported by Chang Hsing-Lang and Charignon,¹ that the 'Polo' found in the Chinese annals of the Mongol Dynasty (Yuan-Shi), who was nominated as a second class commissioner or agent attached to the Privy Council in the year 1277, refers to our author Marco Polo, has been refuted by M. Pelliot.² Since then, no satisfactory identification has been made of Marco Polo from Chinese materials of history.

I have found in a Chinese book an official document which I think refers to the doings of Marco Polo in China, with the only omission of his name in it. The passage runs as follows:

'On the 17th day of the 8th month of the 27th year of Chi-Yuan (September 21, 1290) Minister A-Nan-Da and another official, Bieh-Bu-Hua present jointly a petition to the court, saying:

'We have received a petition from Minister Sha-Pu-Ting which reads:

'On the 3rd month of this year (April-May 1290) the three lords U-Lu-Tai, A-Pi-Shi-Ha and Huo-Jeh have arrived here who are despatched to the Kingdom of the great king

¹ Pauthier's text of Marco Polo, p. ix and p. 361.

Chang Hsing-Lang: *The 'Marco Polo' in the Chinese Books of History*, an article prefaced to the introduction to his Chinese translation of The Book of Ser Marco Polo.

A. J. H. Charignon's *preface to his version of Pauthier's text of Marco Polo*.

² See Pelliot's article in *T'oung Pao* of 1927-1928. Pp. 156-169.

A-Lu-Hun, by the way of Ma-Pa-Rh. Accompanying them are one hundred and sixty persons, among whom ninety have been given their share of government provisions. I have been informed that the remaining seventy are only persons sent as presents (to be slaves to the three lords) by other officials, or bought by them. I beg therefore that provisions be not given to them.'

'The decree of the Emperor after reading this petition is: Let shares of provisions be not given to them!'

The above passage is taken from a Chinese book entitled *Jan-Chi*, which is an odd collection of governmental documents containing regulations and ordinances regarding the post system in the Mongol period, and abstracted from the Chinese Encyclopaedia, *Yung-Lo-Ta-Dian* (now missing), composed in 1408. An examination of it gives us much light on the relation existing between it and what has been described in the book of Marco Polo. In his book (see the *Book of Ser Marco Polo*, of Yule and Cordier's third edition, the 17th chapter of the prologue, pp. 31-33) Marco tells us that Argon, the lord of the Levant (i.e. Persia) had sent three barons as ambassadors to Cathay to request a Mongol lady for his bride from the great Caan Cublay. The names of the three barons were Oulatay, Apusca and Coja. When a maiden was given to them, they decided to return by the sea route and asked Marco's family (i.e. ~~Marco~~, his uncle and his father) to travel with them. A comparison of this chapter with the above Chinese document will show that there is much coincidence between them. For it is very easy, by similarity of pronunciations between the two sources, to identify the Oulatay of Marco Polo with U-La-Tai of our Chinese document, Apusca with A-Pi-Shi-Ha, Coja with Huo-Heh and Argon with A-Lu-Hun. What interests us more is that not only are the names of the three barons of the two sources similar in the two sources, but the order in which they are enumerated in the two books is also the same. And, to complete their coincidence, Ma-Pa-Rh of the Chinese material corresponds obviously with the 'Maabar' of Marco Polo, which is the name of the south-east coast of modern India; and their returning to A-Lu-Hun (Argon) through this place as related by the Chinese passage suggests that the three lords were decided to take the sea route, as was reported by Marco Polo.

It is very safe, therefore, to conclude that the three lords in the Chinese document are the very three barons sent by Argon of Persia as ambassadors to China, and at the time when the petition was written Marco Polo was with them, though his name was not included in the petition.

Another light is thrown to us in the person of Sha-Bu-Ding of our document. According to the *Mongol Annals* (*Yuan-Shi*, vol. 16), Sha-Bu-Ting was a minister of the province of Chiang-Huai, in the year 1290, and Chi'uan-Chou, the Zayton of Marco

Polo, was a port then governed as part of this province (see vol. 62 of the Yuan-Shi). So we infer that at the time when the petition was presented, Marco Polo and the three ambassadors were staying at the port of Zayton.

So far as our knowledge goes, the above passage is the only information we can get from Chinese sources about Marco Polo's stay in China. The absence of his name in this passage is surely very regrettable, but not altogether without compensation. For it gives us light on the position Marco held in the Mongol court. If he had held a high rank in the government, his name should not be omitted in the Chinese petition. We derive from this that the office Marco served in China could not be so exalted as he would have us believe, and this serves as an explanation why it is difficult to find from Chinese materials of history any mention of his name who has left so gloriously a reputation in the western world, and whose book has led to the discovery of America.

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Paper published—14-7-1944.

Some Etched Carnelian Beads from Egypt.

By TSOMING N. SHIAH.

(Communicated by Dr. Kalidas Nag.)

Etched carnelian beads have designs in white colour chemically produced on red carnelian by etching and heating. This technique is still known to the Indian bead-maker at Sindh, who produces the white pattern by soda treatment and heating.¹ In Beck's comprehensive article on ancient etched carnelian beads, he says that the only definite case of specimens of this process for Egypt is a scarab of Amenhetep I.² When the writer was working on ancient Egyptian beads in London, he found three etched carnelian beads from Egypt in the Petrie Collection in the University College, University of London. The most interesting piece among them is one dated to the Eleventh Dynasty. It was found by Petrie in the Tomb 197 at Abydos in 1922, but so far has not been published. Besides the specimen in question, the tomb contained many small ring-beads of blue faience and the 'Antef Stelae' which alone has been published in the Report.³ This tomb has been dated to the Eleventh Dynasty with a fair certainty by the 'Antef Stelae'. The faience ring-beads have a thick and brilliant glaze with a rich deep blue tint, and are characteristic of the Middle Kingdom. Our specimen is a barrel-shaped bead and is etched with an eye-pattern combined with a chevron design (fig. 1), a typical pattern of the beads of the 'Early Phase (before 2000 B.C.)' in Beck's article.⁴ This type of beads was fairly common in Mesopotamia from the Protodynastic times down to the Sargonic period centring upon the Third Dynasty of Ur⁵ and has been found also in Mohenjo-daro, India.⁶ Those from India show the same technique, but are different in form and decoration. On the other hand, two beads from Ur, now in the British Museum (B.M. 120598, and 123213) show striking



FIG. 1. Bead from Abydos. (1/1)

¹ E. Mackay, *Decorated Carnelian Beads*, in *Man* (1933), No. 150, pp. 143-146.

² H. C. Beck, *Etched Carnelian Bead*, in *Antiquaries Journal*, XIII (1933), p. 395.

³ F. W. Petrie, *The Tombs of Courtiers* (1925), p. 10, sec. 20.

⁴ Beck, *op. cit.*, p. 396.

⁵ C. L. Woolley, *Ur Excavation II, Royal Cemetery* (1934), p. 374; also Mackay, 'A' *Cemeteries at Kish*, pt. I, p. 56, pl. IV, fig. 30; and Mackay, *A Sumerian Palace*, etc., pl. xliii, fig. 9; pl. lx, figs. 54-8.

⁶ John Marshall, *Mohenjo-daro and the Indus Civilization* (1932), I, pp. 104-105; II, pp. 515-6; pl. CXLVI, 43-45.

similarity in shape and pattern to our specimen (fig. 2). There



FIG. 2. Beads from Ur.

is no question that our specimen was imported from Mesopotamia. The synchronology between Egypt and Mesopotamia from this evidence can be collated by others. There are two Egyptian alabaster vases inscribed in cuneiform with Sargonic (Akkadian) royal names, Rimus and Naram-Sin.¹ The vases are of the Tenth–Eleventh Dynasty type.² A cylinder-seal inscribed in hieroglyph and cuneiform in the Collection of Carnarvon bears the royal name ‘Sehetepibre’ (Amenemhet I), the first pharaoh of the Twelfth Dynasty, while its cuneiform inscription belongs to the Epoch of the Third Dynasty of Ur as shown by its form of writing, according to Sayce.³ The treasure from Tod in Upper Egypt is dated to Amenemhet II of the Twelfth Dynasty by the cartouche on the box. The box contained many gold, silver, and *lapis lazuli* objects, including cylinder-seals and beads, which are certainly imported from Mesopotamia. Some of the beads of *lapis lazuli* have characteristic forms, such as the faceted barrel-beads with a square cross-section, and the triangular spacers, both of them having been found at Ur.⁴ The cylinder-seals of *lapis lazuli* have cuneiform inscriptions which are of the period of Hammurabi of the First Dynasty of Babylon.⁵ Although the absolute chronology of Egypt and Mesopotamia before the Middle Kingdom could not be fixed quite definitely at present, yet their synchronology is fairly certain as proved by beads and other archaeological objects.

The other two specimens of etched carnelian beads are dated to the Greco-Roman period. Both of them came from Petrie’s excavations at Saft el Henna in 1905-6 (Tomb Nos. 705 and 796s). But the beads in question have not been mentioned in his Report,⁶ nor have been published in his later works. Both of them are circular button-shaped beads with an elliptical or plano-convex-section (fig. 3). The etched white pattern is a circular ring with a row of radiated small crosses on one bead, and a large cross encircled



FIG. 3. Beads from Saft el Henna. (Natural size.)

¹ A. H. Sayce, *The Date of Middle Kingdom, in Ancient Egypt*, 1921, pp. 102-3.

² Petrie, *Stone Vases*, pls. XXVIII, 584, 589; XXIX, 617, 621.

³ Pinches and Newberry, *A Cylinder-seal, etc.*, in *Journal of Egyptian Archaeology*, VII (1921), pp. 190-199, pl. XXXII for Sayce’s remark, see *Ibid.*, vol. VIII (1922), p. 285.

⁴ Woolley, *op. cit.*, p. 369, fig. 78; pls. 144-145.

⁵ B. de la Roque, *Tod, 1934 à 1936*, (1937), pp. 119-121.

⁶ Petrie, *Hyksos and Israeli Cities*, (1906).

by a ring and filled with one dot each at the space between each two arms of the cross on another bead. They belong to the 'Middle Phase (300 B.C.-A.D. 200)' of Beck's scheme.¹ Again, the place of their manufacture is in western Asia. Beads of this type are extremely common in sites of the Seytho-Parthian and Kushan period in the North-west of India.² They have been found even as east as ancient Khotan in Chinese Turkestan.³ This shows how useful the beads are as archaeological evidence for revealing a contact between two cultures in widely separated regions.

I wish to thank my teacher, Prof. S. R. K. Glanville of the University of London, for giving me the kind permission to study the unrivalled collection of beads in his charge with a view to their publication, and regret that the difficulty of communication under the present condition prevents me from sending the typescript of this article for his criticism.

¹ Beck, *op. cit.*, p. 396.

² Marshall, *op. cit.*, p. 583, footnote 11; and also Woolley, *op. cit.*, p. 374.

³ A Stein, *Serindia*, (1921), pp. 117, 122, 127; pl. IV, (Khot. 02r, 02q, Yo, 00125 and Jiya, 005).

Paper received—31-3-1944.

Paper published—15-7-1944.

**Supplement to Bibliography of Ancient Indian
Terracotta Figurines.**

By CHARU CHANDRA DAS GUPTA.

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P R E F A C E .

In the year 1938 my article entitled 'Bibliography of ancient Indian terracotta figurines' summarizing all articles written up to 1936 was published (JRASBL, IV, 1938, pp. 67-120). Since that time so many articles on ancient Indian terracotta figurines had been published that it has been quite necessary to publish their summaries as a supplement to the aforesaid communication. I have, therefore, published them exactly in the same manner as was done in case of the articles mentioned above. This summarizes articles generally written in the period between 1937 and 1942.

ABBREVIATIONS.

A	..	Antiquity.
AAIT	..	Archaic and ancient Indian terracottas. By L. Sternbach.
ABIA	..	Annual Bibliography of Indian Archaeology, Kern Institute, Leyden.
ABORI.	..	Annals of the Bhandarkar Oriental Research Institute.
ADNAR.	..	Archaeological Department of Nizam, Annual Report.
AR	..	Asiatic Review.
ASIAR	..	Archaeological Survey of India, Annual Report.
BMRAH	..	Bulletin des Musées Royaux d'Art et d'Histoire.
EH	..	Excavations at Harappa. By M. S. Vats.
ER	..	Excavations at Rairh. By K. N. Puri.
FEM	..	Further excavations at Mohenjo-daro. By E. Mackay.
GIK	..	Grundzuge der Indischen Kunst. By S. Kramrisch.
I	..	Iraq.
IAL	..	Indian Arts and Letters.
JISOA	..	Journal of the Indian Society of Oriental Art.
JRASBL	..	Journal of the Royal Asiatic Society of Bengal, Letters.
JRSA	..	Journal of the Royal Society of Arts.
JUPHS.	..	Journal of the United Provinces Historical Society.
M	..	Man.
MASI	..	Memoirs of the Archaeological Survey of India.
MR	..	Modern Review.
QJMS	..	Quarterly Journal of the Mythic Society.
RT	..	Rajghat Terracottas. By V. S. Agrawala.

BIBLIOGRAPHY.

1. Agrawala, V. S. JUPHS, X, pp. 59-64; pls. I-III; 1937.

- (1) Terracottas from Ghoshi.

Here the author studies certain terracottas found at Ghoshi in Azamgarh district in the United Provinces of Agra and Oudh. As these specimens are found by chance, 'there is no stratum or level to indicate the period for which our sole criterion for the present remains the style' (p. 59). So far as technique is concerned, these specimens are mainly handmade, the material used is red clay of rough texture and the style is noted by remarkable crudity, verging on the primitive. According to the author these specimens are to be ascribed to the Kushana age. The illustrated specimens are male figure (pl. I, fig. 1), female figure (*ibid.*, figs. 2-4, II, fig. 5) and human head (pls. II, figs. 6-7, III, figs. 8-10).

2. ——— JUPHS, X, p. 88; pl. II, fig. 3; 1937.

- (2) Further acquisitions to the Mathura Museum.

Among some important additions to the Mathura Museum the author has noted an Indian adaptation of the well-known Greek sculpture of 'Herakles and Nemean Lion' made in terracotta (pl. II, fig. 3).

3. ——— RT, pp. 1-8; pls. I-V; 1941.

(3) Here the author has described and illustrated certain terracotta figurines found at Rajghat in Benares district in the United Provinces of Agra and Oudh. The terracottas which have been found here number approximately two thousand specimens and mostly belong to the Gupta age. They are interesting for the varieties of the head-dress and for the paintings in line and colour still preserved on many of them. The illustrated specimens represent human head (pl. I, 1, 3, 4), female head (pl. II, 8), male bust (pl. I, 2), head of Pārvati-Parameśvara (pl. III, 12), Kinnara-mithuna (pl. IV, 13), scene representing *aśoka-preikha* (*ibid.*, 14), hunter (pl. V, 15) and Śiva (*ibid.*, 16). It seems that the specimens nos. pls. II, 5-7, and III, 9-11 have not been described.

4. Anonymous. AR, XXXII, pp. 769, 770; figs. A, B; 1936.

Archaeology in Baroda.

The author describes and illustrates certain terracotta figurines found at Kamrej in Navsari district of the Baroda State (fig. A) and at Amreli in Kathiawar (fig. B).

5. Chandra, G. C. ASIAR for 1934-35, p. 40; pl. XVII, b; 1937.

(1) Excavations at Nalanda.

In course of excavation at monasteries Nos. 11 and 12 at Nalanda in Patna district in Bihar the author has discovered a number of 'terracotta plaques decorated with human and animal figures' (pl. XVII, b) (p. 40).

6. ——— ASIAR for 1935-36, p. 53; pl. XVI, f; 1938.

(2) Excavations at Rajgir.

In course of exposing the circular brick structure known as the Maniyar Math at Rajgir in Patna district in Bihar the author has discovered a large number of terracottas representing human and animal figurines (pl. XVI, f).

7. Corbiau, S. BMRAH, mars-avril, pp. 1-3; 1936.

(1) Collection de pieces provenant de l'Inde.

Here an account has been given of the terracottas found at Sari-Dheri and Sulai-Dheri in Peshawar district in the North-West Frontier Province. Major D. H. Gordon who discovered the mound of Sari-Dheri thought that the civilization evidenced by these specimens could be dated from c. 250-50 B.C.; but the present authoress believes that the archaic figurines found here belong to the 3rd-4th millenniums B.C. and that the later figurines to the Graeco-Buddhist age. Most of these archaic figurines have analogies with the Sumerian (age of Jemdet Nasr), Aegean (ancient Minoan) and Russian Turkestan (Anau III) antiquities. The illustrated specimens represent a human head (fig. 11) and a human bust (fig. 15)—both in Graeco-Buddhist style. The remaining figures are of archaic character and represent two unidentifiable specimens (frontispiece and fig. 12), a female figure (fig. 13) and another archaic figurine (fig. 14).

8. ——— M, XXXVII, pp. 150-52; 1937.

(2) Prehistoric remains on historic sites of India and the Near East.

In this paper the authoress has opined that Sari-Dheri 'forms part of a vast cultural cycle that will be met in the deeper layers of many sites of historical date, that there are many points of analogies between these archaic Indian remains with regions so far off as pre-Hittite Asia Minor and the Early Minoan Aegean,' that 'a whole stratum of Taxila bears the mark of Scythian art' which flourished in South Russia from the sixth to the second century B.C., and that 'Taxila appears to be of first importance also for the history of religions'. She doubts

the dating of the civilization of the Near East and remarks that 'if there was a time when the Harappa culture had to rely upon Mesopotamia for its date, now it is the turn of India to enlighten the dating of the Near East'.

9. ——— I, Vol. IV, pp. 1-10; pls. II, 2-5, III, 1-3, 5-7, IV, 1-4, 8, 9; 1939.

(3) New finds in the Indus Valley.

Here the authoress gives a short account of her excavations at the mounds at Sari-Dheri, near Charsadda in Peshawar district in the North-West Frontier Province and at Sulai-Dheri, otherwise known as Rajjar in the same district. According to Lt.-Col. D. H. Gordon the archaeological remains found at the former mound belonged to the Hellenistic culture which arose in India after the demise of Alexander the Great; whereas the present authoress proves that although some of the terracottas found here prove his point of view, yet there are certain specimens which, from their style and technique, are far more ancient. According to her opinion she has rightly found an archaic head (pl. II, 3) at a much lower level of the eastern mound at Sari-Dheri than the Hellenistic head (*ibid.*, 2). At Sulai-Dheri also she gets archaic figures below and Hellenistic figures above. The illustrated specimens which are new are Hellenistic head (pl. II, 2, 4), archaic head (*ibid.*, 3, III, 3, 5), archaic female figurine (pls. II, 5, III, 1, 2, 7), female torso (pl. III, 3), female figure (*ibid.*, 6), roughly made figurines (pl. IV, 1), schematic figurine (*ibid.*, 2-4), black terracotta figurine (pl. IV, 8), torso (*ibid.*, 9).

10. Das Gupta, C. C. JRSBL, IV, 1938, pp. 67-120; 1939.

Bibliography of ancient Indian terracotta figurines.

In this paper the author has given a complete bibliography of ancient Indian terracotta figurines up to 1936 and has summarized no less than 175 articles and books dealing with ancient Indian terracottas. The articles have been arranged according to the author in the alphabetical manner. Three indexes dealing with author, find-spot, subject and geography have been added.

11. Dikshit, K. N. MASI, 55, pp. 56-72; pls. XXVI *a*, *b*, XXXIX-LIV, LV, *c*, *d*, LVII, LXIV; 1938.

Excavations at Paharpur, Bengal.

While giving a consolidated account of the excavations at Paharpur in Rajshahi district in Bengal the author has given a short account of the terracotta figurines found there. He finds the point of similarity between the plaques found at Paharpur and those found at Harwan in Kashmir, Hanumangarh in

Bikaner, Mirpurkhas in Sind, Bhitargaon in Cawnpore district, Sahet-Mahet in Gonda and Bahraich district in the United Provinces of Agra and Oudh, Mahasthan in Bogra district, Sabhar in Dacca district and Dah Parbatiya temple near Tezpur in Assam. Regarding the arrangement of these plaques he has remarked, 'An intensive study of the plaques, as they stand *in situ*, fails to bring out any regular sequential arrangement, and it appears as if it was only chance that determined whether a plaque with human figure was to be followed by a striding monkey, a goose or a conch'. He has opined that these plaques range in date from the eighth to the tenth centuries A.D. The illustrated specimens are ascetic (pl. XXVI *a*, *b*), monkey-story (pl. XXXIX, *c*, 2), Krishna legend (ibid., *c*, pl. XLI, *a*, 3), līṅga (pls. XXXIX, *f*, 1, LVI, *C*), woman carrying water (pls. XL, *a*, 1, *c*, 3), composite animal (pls. XL, *a*, 5, *b*, 3, 4, *c*, 5, *d*, 5, XLI, *b*, 4), Śiva (pls. XLI, *d*, 2, XLIV, *a*, *e*), men walking (pl. XLII, *b*), woman with children (pls. XLI, *c*, 1, XLII, *c*, 1), Gaṇeśa (pls. XLII, *d*, XLIV, *d*), Viṣṇu (pl. XLII, *d*, 5), man doing acrobatic feats (ibid., *e*), Nāga-figure (pls. XLIII, *c*, 1, 3, *e*, 3, XLVI, *b*, *f*), story of man being drawn out of well (pl. XLIII, *f*), mating cobra (ibid., *g*), women with children (ibid., *i*, 5), Brahmā (pl. XLIV, *b*), Tārā (ibid., *c*, XLV, *d*, *e*), Mañjuśrī (pls. XLIV, *f*, XLV, *f*), Bodhisattva Padmapāni (pl. XLV, *a*), Buddha (ibid., *b*), Jambhala (ibid., *c*), kirtimukha (pl. XLVI, *a*), peacock fighting with cobra (ibid., *c*, LV, *c*), cobra issuing from hills (pl. XLVI, *d*), Gandharva riding a rhinoceros (ibid., *e*), lion-face with crossed legs (pl. XLVII, *a*), Gandharva (pl. XLVII, *b*, *f*), Gandharva with vidyādhari (ibid., *c*), antelope (pls. XL, *d*, 4, XLII, *a*, 3, 5, XLVIII, *a*), man pulling down hillock (ibid., *b*), Rāma legend (ibid., *c*, *e*), Rāma-Lakshmaṇa (ibid., *f*), Śabara female (pl. XLIX, *a*, *f*), Śabara couple (ibid., *b*, *c*, *e*), Śabara male (ibid., *d*), human figure (pl. L, *a*, *b*), human bust (ibid., *c*, *d*), seated man (ibid., *f*), man beating gong (pl. LI, *a*), man holding drum (ibid., *b*), man beating time on pitcher (ibid., *c*), man holding lute (ibid., *d*), man dancing (ibid., *e*), man playing on vīṇā (ibid., *f*), kilotpātī vānaraḥ story (pl. LII, *a*), elephant and mice (ibid., *b*, *c*), story of lion and hare (?), (ibid., *d*), story of talking cave (ibid., *e*), deer drinking water (ibid., *f*), elephant (pls. XLI, *c*, 3; LIII, *a*), camel (pl. LIII, *b*), monkeys entertained (ibid., *c*), lizard (ibid., *d*), deer looking up (ibid., *e*), horse (ibid., *f*), bird feeding her young ones (pl. LIV, *a*), Garuda (ibid., *f*), goose (pls. XL, L, 1, LIV, *c*), peacock (pl. LIV, *d*), goose feeding her young ones (ibid., *e*), goose eating lotus (ibid.), warrior (pls. XLI, *c*, 3, LVII, *a*, *b*, *e*), lizard (pl. XL, *e*, 2), fish (pls. XL, *e*, 5, XLII, *a*, *b*), tiger (pl. XL, *f*, 4), lion (pl. XLI, *b*, 5), deer (ibid., *d*, 3), king and queen (pl. XLII, *a*, 1), monkey (ibid., *b*, 2), man's combat with lion (ibid., *d*, 3), peacock (ibid., *f*, 3), man and woman holding cymbals (pl. XLIII, *d*), boat paddled by two persons (ibid., *a*), jackal and lion (ibid., *h*), crocodile head (ibid.,

i, 4), woman and children (*ibid.*, *i*, 5), bear (*ibid.*, *j*, 3) and antelope (*ibid.*, *j*, 4). It is strange that many illustrations have not been described in the text.

12. Dutt, G. S. JISOA, VI, pp. 169–80; pls. XXXVI–XXXIX, 1938.

Bengali Terracottas.

In course of giving an interesting résumé of Bengali terracottas the author has opined that this art may be divided as belonging to two periods, one ending with the close of the Pāla and Sena ages and the other till almost the end of the nineteenth century. Though he has given an account of the first type of specimens, yet the article is almost devoted to the study of the terracotta plaques found on the Deul, a monument of probably the seventeenth century A.D. at Mathurapur in Faridpur district in Bengal. The illustrated specimens which are taken from the Deul itself represent the lion-belt (pl. XXXVI, 2), Rāmāyana and Kṛishṇa-līlā scenes (*ibid.*, 4, pl. XXXVII, 1), Kīrtimukha (pls. XXXVI, 1, XXXVII, 3), Kīrtana-scene (pl. XXXVI, 2), two females worshipping one Kalpataru (*ibid.*, 3), Lakshmaṇa (pl. XXXIX, 2), lion (śārdūla) rampant superimposed on an elephant (*ibid.*, 4), superimposed figures of armed soldiers (*ibid.*, 5), herd of deer fleeing from hunters (pl. XXXVIII), hunting scene (pl. XXXIX, 3, 6), plaque representing two sphinexes (*ibid.*, 1).

13. Gordon, D. H. I, Vol. V, pp. 85–88; pls. VI–IX; 1938.

(1) The age of frontier terracottas.

This is a reply to Corbier's paper summarized as No. 9. According to the present author the Channavira, etched carnelian beads, lids in the central knob handles, applied and incised techniques in eye-form, fan-shaped head-dress are not convincing criteria for drawing any deductions. He opines that the goddess represented in the terracottas with the rosetted head-dress is Anaitis, Anahid or Nanaia. In order to illustrate his points of argument the author has illustrated certain specimens which are archaic head (pl. VI, fig. 1; fig. 2—left figs.), human head (*ibid.*, fig. 2—third and fourth figs. from left), head with the knotted head-dress (*ibid.*, fig. 3), head with the conical Parthian cap (pl. VII, fig. 4), moustached Scythian figures (pl. VII, fig. 5), archaic figure (pl. VIII, 6 and 7), archaic and Hellenistic head (pl. VIII, fig. 8), archaic moulded figure (*ibid.*, fig. 9), primitive female figure with the fan-shaped head-dress (pl. IX, fig. 10), Hellenistic head (*ibid.*, fig. 11), mask-like face (*ibid.*, fig. 12).

14. ——— M, XXXVII, pp. 198-99; 1937.

(2) Prehistoric remains on historic sites: a reply.

This is a reply to Mlle. Corbiau's article summarized as article No. 8. According to him the terracottas from Sari-Dheri and other kindred sites may be divided into three groups, viz., the terracottas of Hellenistic appearance, Syrian derivation of 180-50 B.C. and a group of figurines and animals which appear to be just pre-Kushan of 100 B.C.-300 A.D.

15. ——— A, XI, pp. 70-79; pls. I and II; 1939.

(3) The mother-goddess of Gandhāra.

From the evidence of the terracotta figurines which have been dated from the third century B.C. to the 3rd century A.D. the author has established that a cult of the Mother-Goddess in her manifestation as the Persian Anaitis existed in India.

16. Gordon, D. H. and M. E. I, Vol. VII, pp. 1-12; pl. I; 1940.

(1) Mohenjo-daro; some observations on Indian pre-history.

Among various topics the authors have made some observations on terracotta figurines found at Mohenjo-daro. So far as female figurines are concerned, they have remarked that almost all these have the fan-shaped head-dress, that where the eyes are present, they are applied, that 'they are practically, without exception, of pink-coloured terracotta with a red wash, that the majority of the figures have a single necklace and that they have a narrow applied loin-cloth and are not completely nude. Regarding the male figurines they have remarked that 'they are for the most part of the same pink pottery, that the majority of these figurines have no head-dress, but a certain number have widespread horns and that these figures are completely nude. They also refer to human masks, man-headed animals and ordinary animals. They hold that there is no Yogic influence in the face of any figure. They do not hold the view of Dr. Mackay that certain terracottas of rough workmanship are the work of children and believe that the Mohenjo-daro terracottas have no Sumerian affinities. They have illustrated the figure of a man (pl. I) found in Zhob which is, according to them, the most Sumerian looking object yet found in India.

17. ——— JRASBL, VI, pp. 61-72; pls. 4, 5; 1940.

(2) Survivals of the Indus Culture.

Here the authors have shown the points of similarity between the objects of the Indus Valley age and those of the later ages and in proving this point they have illustrated a few terracotta figurines among other objects. The illustrated specimens are

bird (pl. 4, 1, 2), bird-whistle (ibid., 3), bird-rattle (ibid., 4), Hellenistic head (ibid., 5), divided figure (pl. 5, 1, 3) and female figure (ibid., 2).

18. Johnston, E. H. ABIA for 1937, p. 16; pl. V; 1939.

Indian Institute, Oxford.

The author has illustrated a female figure (pl. V). According to him 'the best authorities place it in the third century B.C., and it certainly cannot be later than the first century B.C.'

19. Khan, H. H. ASIAR for 1935-36, p. 70; pl. XXXIX, *d*; 1938.

Exploration in the Madras Presidency.

The author reports the discovery of a few terracotta figurines on the summit of the cairn hill on the Nilgiris among which one representing the head of a cow (pl. XXIX, *d*) has been illustrated.

20. Kramrisch, S. GIK, pp. 127-28, tefel 47; 1924.

The authoress illustrates a magnificent Vishnu-head preserved in the Museum of the Varendra Research Society.

21. ——— JISOA, VII, pp. 89-110; pls. VII-IX; 1939.

(2) Indian Terracottas.

Here the authoress has given a highly interesting account of Indian terracottas. There are certain conclusions which are quite important. According to the opinion of the present authoress there are two types of terracottas, viz., (1) ageless type and (2) timed variation. Then she has dealt with earth, physiognomy, costume and conveyance. So far as the type of the timed variation is concerned, she has given an idea of data, technique and places. She has given an elaborate description of Pataliputra, Buxar and Mathura terracottas. The illustrated specimens are all taken from the Patna Museum collection and represent male figure (pls. VII, 1-4, 6, 13, 14, VIII, 7, 10, 11, IX, 6), male torso (pl. VIII, 6), male figure with ram (ibid., 8), Yaksha (ibid., 9), male head (ibid., 12, 13), female figure (pls. VII, 5, 7-11, VIII, 2, IX, 1-5), female figure with serpent-head (pl. VII, 12), human head (pl. VIII, 1), animal-head (?) (pl. VII, 15), elephant (ibid., 16, pl. VIII, 4), griffino (pl. VIII, 3) and horse (ibid., 5).

22. Machay, E. JRSA, LXXXV, p. 542; fig. 8; 1937.

(1) Excavation at Chanhudaro.

The author describes and illustrates one female figurine (fig.) found at Chanhudaro in Nawabshah district in Sind and

referable to the Indus Valley age. According to him this represents mother-goddess.

23. ——— FEM, I, pp. 257-316; II, pls. LXVI, 23, LXXI, 23, 25-32, LXXII, LXXIII, LXXIV, 1-5, 7, 8, 13, 14-17, 21-26, LXXV, 1-23, LXXVI, 1-25, LXXVII, 2-7, 10-12, 17, 18, 21, 22, LXXVIII, 1, 3, 5-9, 11, 12, LXXIX, 1-4, 7-17, 22, 23, 25-27, 29-33, LXXX, 1, 2, 4, 6-12, 14-23, 25-27, LXXXI, 1-5, 7-11, 13, 14, 17-19, CXII, 10, 11; 1938.

(2) Here the author has described and illustrated certain terracotta figurines found in course of excavation between 1927 and 1931 at Mohenjo-daro in Larkana district in Sind and belonging to the Indus Valley age. He has divided these specimens into two groups, viz., human and animal. Further each group of figurines has been divided into two classes, viz., those found in the upper levels down to 12 ft. below datum and those from below that level. So far as human figurines are concerned, he has shown that 'most of the figurines were painted over with a red slip or wash', that 'in only a few of the better made figurines is the red slip polished.' 'Besides the general coating of red, there is now definite evidence that on some at least of these figurines other colours also were used.' According to the author 'none of the female figurines are represented as entirely nude; they usually wear a short, plain kilt . . . sometimes ornamented with medallions'. So far as the modelling of these figurines is concerned, the author has shown that the eyes are represented by flat pellets of clay, that the nose was formed simply by pinching up the clay, that the nostrils are merely represented by holes, that the ears are never represented except the animal—like ears associated with horns. Regarding the dating of these figurines he has remarked, 'I find it impossible as yet to distinguish with any degree of certainty between the figurines from the upper and lower levels respectively' (p. 270). The illustrated specimens represent human figure (pl. LXXIII, 7, 13, LXXIV, 14, 16, LXXV, 11, 20, LXXVI, 6, 14, 17, 19), human head (pls. LXXIII, 3, LXXIV, 21, LXXVI, 9, 12), human double head (pl. LXXVI, 8), human mask (pls. LXXIV, 22, LXXVI, 1, 2, 4), male figure (pls. LXXII, 3, 7-10, LXXIII, 1, 8, LXXIV, 17, 2, 3, 24, LXXVI, 15, 16, 23, 24), male mask (pls. LXXIV, 25, 26, LXXVI, 3), male bust (pl. LXXVI, 18), male child (pl. LXXVI, 25), female figure (pls. LXXII, 1, LXXIII, 2, 4, 6, 12, LXXIV, 15, LXXV, 2, 4, 5, 6, 8-10, 13, 15-19, 21-23, LXXVI, 7, 10, 11, 20-22), mother and child (pls. LXXII, 2, LXXV, 3, 7, 12, 14, LXXVI, 13), female torso (pl. LXXII, 5, 6), female bust (pl. LXXVI, 5), mother-goddess (pl. LXXV, 1) and crawling child (pl. LXXVIII, 10). So far as the animal figurines are concerned, he has remarked that 'like the human figurines, the animal figures were frequently

coated with a red wash or slip, varying from a light to dark red' (p. 283). The illustrated animal and bird figurines are dove (pls. LXXI, 28, LXXIV, 4, LXXVII, 3, 5, 11, 12, LXXX, 15, 18, 23, 25, 27), fowl or goose (pl. LXXIV, 1), fowl or dove (pl. LXXIV, 2), pheasant (ibid., 3), fowl (pls. LXXVII, 4, LXXX, 20), dove or cock (pl. LXXVII, 7), crested bunting (ibid., 6), goose or duck (ibid., 10), peacock (pl. LXXX, 22), monkey (pls. LXXI, 27, LXXVIII, 3, 8, 9, LXXX, 1, 2, LXXXI, 18, 19), antelope (pls. LXXVII, 2, LXXX, 4), dog (pls. LXXVII, 17, LXXVIII, 7, LXXIX, 4, 11, 12, 15, LXXX, 9), rhinoceros (pls. LXXVII, 22, LXXIX, 2, 3), bull (pls. LXXVIII, 1, 6, LXXIX, 16, 17, 25-27, 29, 30-32, CXII, 10, 11), horse (pl. LXXVIII, 11), cross-bred animal (pl. LXXI, 26), bull's head (pls. LXXIV, 8, LXXIX, 22, 23, 33), turtle (pls. LXXVII, 21, LXXX, 6), Gaur (pl. LXXVIII, 5), boar (pl. LXXIX, 1), hare (pl. LXXIX, 9, 10), elephant (ibid., 13-14), buffalo (pl. LXXX, 7), ram (ibid., 8, 12), goat (ibid., 11), unidentifiable animal (pls. LXXIV, 13, LXXIX, 7, 8, LXXX, 10, 19, LXXXI, 1, 1a, 2, 2a, 7-9), *Gallus domesticus* (pl. LXXIV, 5), unidentifiable figure (ibid., 7, LXXVIII, 12), dog-like animal (pl. LXXVII, 18), female kid (pl. LXXX, 14), head of bird (ibid., 16), dove or pigeon (ibid., 17), unidentifiable bird (ibid., 21, 26, LXXXI, 13, 17), composite animal (pl. LXXXI, 3, 4, 10, 11, 14) and figure having bird-like head (pl. LXXXI, 5).

24. Majumdar, N. G. ASIAR for 1934-35, pp. 41-42; pl. XVIII, 1, 3; 1937.

(1) Exploration in Bengal.

In course of excavating the mound known as Medh at Gokul in Bogra district in Bengal the author has found a number of terracotta plaques among which some have been illustrated. They represent the fragmentary hand of Vishṇu (pl. XVIII, 1) and a squatting male figure (ibid., 3). All these belong to the late Gupta age.

25. ——— ASIAR for 1935-36, pp. 64-65; pl. XXII, *a-e*, *g-o*; 1938.

(2) Explorations at Lauriya-Nandargarh.

While exploring the ancient mounds at Lauriya-Nandargarh in Champaran district in Bihar the author has discovered a large number of terracotta figurines among which a few have been illustrated. The illustrated specimens represent human child (pl. XXII, *b*), human figure (ibid., 1, *n*), female figure (ibid., *g, h, i, j, k, m, o*), duck (ibid., *c*), and elephant head (ibid., *d*). These examples should be ascribed to the Śuṅga age, i.e., second and first century B.C. on the stylistic consideration. It seems that the author has not described the specimens illustrated in pl. XXII, *i, k, l* and *n*.

26. ——— ASIAR for 1935-36, pp. 68, 69; pl. XXVIII, 4, 5, 8, 11, 12; 1938.

(3) Excavations at Gokul.

While excavating the mound known as Medh in Gokul in Bogra district in Bengal the author has discovered a number of terracotta plaques bearing human and animal figures among which some have been illustrated. The illustrated specimens which represent human figure (pl. XXVII, 4, 5), head of lion (ibid., 8), boar (ibid., 11) and crocodile or Makara with the rider (ibid., 12) are typically Gupta in style and may be ascribed to the sixth or seventh century A.D. The author in a foot-note informs us that similar terracottas were found by him at Govinda Bhita mound in Mahasthan in Bogra district in Bengal.

27. ——— ASIAR for 1936-37, p. 50; pls. XXII, XXIII, 4-18, XXIV, 7-16; 1940.

(4) Excavations at Lauriya-Nandangarh.

In course of excavation at the mound at Lauriya-Nandangarh in Champaran district in Bihar the author has discovered a large number of terracotta figurines among which some have been described. It is very strange that only a few out of the illustrated specimens have been individually described. Regarding the age of the monument buried under this mound the author has observed that 'there is evidence to show that this structure must have been erected not later than the second century B.C.' The illustrated specimens which have been described are human head (pl. XXII, 9), Lakshmī (pl. XXIV, 11, 16), mother and child (ibid., 14, 15).

28. Nazim, M. ASIAR for 1934; pp. 32-33; pls. X, 15; XI, 7, 14, 19, 25, 29, 31; 1937.

Excavations at Harappa.

In course of excavation at mounds A, B, D and F at Harappa in Montgomery district in the Punjab the author has unearthed a number of terracotta figurines among which he has described and illustrated a few only. These specimens belong to the Indus Valley age. The illustrated examples represent fish (pl. X, 15), model of a tiger (pl. XI, 7), unidentifiable animal-head (ibid., 14), turtle (ibid., 19), female figure (ibid., 25, 31) and male figure (ibid., 29). It is important to note that the above-mentioned terracotta fish (pl. X, 15) 'shows five pictographs on the under-side' (p. 32).

29. Puri, K. N. ER, pp. 26-34, pls. XII-XVII, XVIII, 1-3, 6-8, 12; 1942.

Figurines and model animals.

Here the author gives an account of terracotta figurines found at Rairh in Jaipur State. He opines that among the female

figurines found here many represent mother-goddess which has been divided into eleven types. The illustrated specimens are mother-goddess (pls. XII, XIII), Yakshī (pl. XV, *a, c, g*), Śiva-Pārvatī (pl. XV, *b, f*). Śakti with male deity (pl. XV, *d*), elephant-rider (pl. XVI, 1), horse-rider (ibid., 8), nude male figure (pl. XVIII, 2), human figure (ibid., 6–8, 12), elephant (pl. XVI, 2, 3(*a*), (*b*), 5), bull (ibid., 7), camel (ibid., 9), cow with calf (ibid., 1*a*, and *b*, 12), monkey (pl. XVII, *a, b, d*), ram (ibid., *e, h*), tiger (ibid., *g, j*), unidentifiable animal (ibid., *c, f*), dog (ibid., *k*), dove (ibid., *i*), owl (ibid., 1). It seems that the specimens illustrated in pls. XIV, XV, *e*, XVI, 4, 6, 10, XVII, 1 and 3 have not been described.

30. Ramachandran, T. N. ASIAR for 1935-36, pp. 118–19; pl. XXXVI, 5–8; 1938.

(1) Indian Museum, Calcutta.

Here the author discusses five terracotta figures which were found near Ghosi in Azamgarh district in the United Provinces of Agra and Oudh. The illustrated specimens represent female figure (pl. XXXVI, 5), male figure (ibid., 7) and male head (ibid., 6, 8).

31. ——— ASIAR for 1936-37, pp. 52–54; pls. XV, *a, b, d, e*; XVI *a–e, g, h*; 1940.

(2) Excavations at Mahasthan.

In course of excavation at Govindabhita mound in Mahasthan in Bogra district in Bengal the author has discovered a number of plaques among which some have been illustrated. The illustrated specimens represent male head with ushṇisha (pl. XV, *b*), mīthūna (ibid., *d*), Yaksha (ibid., *e*, pl. XVI, *a*), conventional geese (ibid., *b*), Yama (ibid., *c*), dragon and elephant-headed makaras (ibid., *d, e*). It seems that the description meant for pl. XV, *b* has been wrongly ascribed to pl. XVI, *g* and that pl. XVI, *h* is undescribed. Regarding the figure illustrated in pl. XV, *a*, the author is of opinion that it may represent Māyā's dream or the second dream of Mārudevī, the mother of the first Tīrthaṅkara, Rṣhabha-deva (p. 54).

32. S. S. QJMS, XXX, pp. 362-63, pl. facing p. 362; 1939-40.

A note on the terracotta figurines at Pondicherry.

The author illustrates two terracotta figurines (pl. facing p. 362) found at Danatumoder, south of Tirukaji near Pondicherry.

33. Saraswati, S. K. MR, LIX, pp. 295–97; 1936.

A clay head from Kalinjar (Bogra).

The author describes and illustrates one terracotta male head found at Kalinjar in Bogra district in Bengal. According

to him it should be referred to the Pāla age while Dr. Kramrisch refers it to the fifteenth century A.D.

34. Srivastava, H. L. ASIAR for 1936-37, p. 40; pl. X; 1940.

Excavations at Harappa.

In course of excavation at Harappa in the Montgomery district in the Punjab the author has found a female figurine (pl. XI, *g*) belonging to the Indus Valley age.

35. Sternbach, L. AAIT, pp. 1-26; pls. I-XVII; 1941.

Here an account has been given of some ancient Indian terracottas in the collection of Dr. Eugene Banasinski, Consul-General for Poland in Bombay. Here the terracottas under discussion have been placed under five different groups, viz., those belonging to the Indus Valley, late pre-Maurya, Śuṅga, Kushan, and Gupta ages. Besides some animal terracottas have also been described. The illustrated specimens are female figure (pls. I, 1, 2, III, 7, IV, 8-10, V, 11, 12, IX, 28, XII, 31, XIII, 32, 33, XIV, 34, 35, XV, 36), human head (pls. I, 3, II, 4, 5), male head (pls. V, 13, VI, 14, X, 26, 27, XV, 37), female head (pls. VI, 15, VII, 18, 19, XII, 30), human bust (pl. III, 6), warrior (pl. VI, 16, 17), yaksha (pl. VIII, 20), half-man and half-monkey (*ibid.*, 21), man-monkey (pl. IX, 22, 23), female bust (pl. IX, 24), mother-goddess (pl. X, 25), naṭī (pl. XI, 29), unidentifiable animal (pls. XVI, 38, XVIII, 43), ram (pl. XVI, 39), bull (pl. XVII, 40), bull's head (pl. XVIII, 41, 42).

36. Takacs, Z. de. JISOA, V, pp. 171-6; pl. XIX, 3, 5, 6, 8; 1937.

Kushana art in the Francis Hopp Museum at Budapest and some related art products.

The author has described certain terracotta figurines, among other objects, said to have been found at Mathura. According to the author these belong to the Kushana age. The illustrated specimens represent head and torso of Indo-Parthian figure (pl. XIX, 3), human figure (*ibid.*, 5), half-figure of a man (*ibid.*, 6) and female head (*ibid.*, 8).

37. Vats, M. S. ASIAR for 1935-36, p. 37; pl. XII, *b*, 14; 1938.

(1) Explorations in Khairpur State, Sind.

In course of excavating the Kotasur mound in Khairpur State in Sind the author has discovered a number of toys among which one has been illustrated. (pl. XII, *b*, 14). This is to be ascribed to the Indus Valley age.

38. ———. EH, pp. 292–309, pls. LXXVI, 1–30, LXXVII, 31–69, LXXVIII, 3, 6–17, 21, 22, 26, 27, 31–41, LXXIX, 46–66, 69–73, 75–88; 1940.

(2) Here the author has given an idea of the terracotta figurines found at Harappa in Montgomery district in the Punjab in course of excavation carried out there between 1920–21 and 1933–34. Among the discovered human figurines 'nearly two-thirds of them are female and over one-third male, the latter not being so rarely as at Mohenjo-daro.' The animal figurines which have been found here are great in number. According to him 'Harappa offers a greater variety of animal figures than those yet published from Mohenjo-daro' (p. 300). The illustrated specimens are male figure (pls. LXXVI, 1–21, 27, LXXVII, 66), male (?) head (pl. LXXVI, 22), female figure (pls. LXXVI, 23, 26, 30, LXXVII, 49–53, 55, 61, 62, 64–67), female head (pls. LXXVI, 24, LXXVII, 39–44, 60), human feet (pl. LXXVII, 25), pregnant woman (ibid., 28, 29, LXXVII, 69), mother and child (ibid., 31–33), female bust (ibid., 34–38, 45–48, 54, 56, 57, 63), female torso (ibid., 57), female hand (?) (pl. LXXVII, 59), human figure (ibid., 68). The illustrated bird-specimens are parrot (pl. LXXVIII, 3), sparrow (ibid., 6), unidentifiable bird (ibid., 7), pigeon (ibid., 8, 9), kite (?) (ibid., 10, 11), cock (ibid., 12), hen (ibid., 13), peacock (ibid., 14, 15), duck (ibid., 16), goose (ibid., 17), tortoise (ibid., 21), crocodile (ibid., 22), arimadilo (ibid., 26), grasshopper (ibid., 27), squirrel (ibid., 31–34), monkey (ibid., 35–36), pig (ibid., 37, 38), unidentifiable animal (ibid., 39), goat (ibid., 40), ram (ibid., 41), hare (pl. LXXIX, 46), mastiff (ibid., 47), hound (ibid., 48), dog (ibid., 49–57), cat (ibid., 58), bull (ibid., 59–66), bull's head (ibid., 69–73), rhinoceros (ibid., 75–79), elephant (ibid., 80–82), tiger (ibid., 83–87) and bijugate chimera-head (ibid., 88).

39. Yazdani, G. ADNAR for 1935–36, p. 23; pls. IV, *b*; V, *c*; 1938.

(1) Note on the excavations at Maski in Hyderabad.

While carrying out excavations at Maski in Hyderabad the author has found a number of terracotta figurines among which a few have been illustrated. Regarding the age of these figurines it has been opined that they belong to the period ranging from 500 B.C. to 100 B.C. No illustrated example has been described. The author has opined that 'one figurine representing a woman with long trunk and short legs is very primitive and bears striking resemblance to similar figurines found in Mediterranean countries, particularly at Malta'; but he has not given the reference to this extract.

40. ————ABORI, XXII, pp. 176, 177, 178, 184; pls. VIII–XI, XVIII; 1942.

(2) Excavations at Kondapur.

In course of an address on the first excavations at Kondapur in Medak district in Hyderabad the author has given an idea of the terracotta figurines found there. The illustrated specimens are Bodhisattva or Yaksha or Rājā (pl. VIII, *a–d*), Yaksha (pl. IX), Bodhisattva (pl. X, *a*), human head (ibid., *b*), Kuvera or Yaksha (pls. XI, *a, b*), Hārīti with child (ibid., *c*) mother-goddess (?) (ibid., *d*), lion (pl. XVIII, *a*), ram (ibid., *b*), horse (ibid., *c*—the left fig.), bull (ibid., *c*—the right fig.). They are to be ascribed to the period extending from c. 200 B.C.–200 A.D.

41. Yusuf, S. IAL, XII, p. 87, pl. VIII, *b, c*; 1938.

Paithan excavations.

In course of excavation at Paithan in H.E.H. the Nizam's dominions the author discovered a number of terracotta figurines among which a few have been illustrated. The illustrated specimens are male bust (pl. VIII, *b*) and human bust (ibid., *c*). According to the opinion of the author 'the workmanship bears striking resemblance to that of the figurine found at Mohenjo-daro, Chanhudaro, and Maski and other prehistoric sites' (p. 87).

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An Outline of the Stone Age in India.

By S. N. CHAKRAVARTI.

(Communicated by Dr. Kalidas Nag.)

The presence of old Stone Age remains in India was first recognized by R. Bruce Foote, who in 1863 had discovered the first palaeolith at Pallavaram, ten miles south-west of Madras, in the debris from a small ballast pit dug in the thin bed of laterite gravel overlying the basal granite gneiss. Foote's recognition of the specimen from Pallavaram as a true palaeolith was fully confirmed later in the same year by the discovery of similar artifacts, made by him in company with William King, at Attirampakkam, about forty miles north-west of Madras, on the banks of the nullah falling into the Korttalaiyar river two miles to the south-east.

From that date onwards palaeolithic implements have been collected in many parts of India from high-level gravel-beds, or older alluvia, of rivers, both in South and North India, and laterite formations of the Coromandel Coast. They have been found, proceeding northwards from Cape Comorin, in the Madura, Tanjore, and Trichinopoly districts of the Madras Presidency; in the Mysore State; in the Bellary, Cuddapah, North Arcot, Chingleput (e.g., at Pallavaram, Attirampakkam, and Vadamadurai), Nellore, Kurnool (e.g., at Giddalore), and Kistna districts of the Madras Presidency; in the Hyderabad State (e.g., in the Upper Godavari valley at Mungi); in the Dharwar, Bijapur, and Belgaum districts of the Bombay Presidency; at Kandivli, near Bombay; in the Baroda State (e.g., in a section of the right bank of the Sabarmati river opposite the village of Sadolia on the left bank); in the Narbada valley of Central India (e.g., at Bhutra and other localities between Narsinghpur and Hoshangabad in the Central Provinces); in the Saugor and Damoh districts of the Central Provinces; in the Rewah State and Bundelkhand Agency of Central India; in Rajputana; in the Punjab (e.g., in the Soan valley and on the banks of the Indus river from Attock to the junction with the Soan); in Jammu and Punch States; and in Chota Nagpur, Bihar, and Orissa. In 1865 A. B. Wynne discovered an agate flake at Mungi, near Paithan, in Hyderabad, and in 1873 C. Hacket found a handaxe at Bhutra in the Narsinghpur district. Both artifacts were found, embedded in gravels, in association with fossil mammal remains.

But no serious attempt was made to study old Stone Age remains in India on a geological basis until quite recently. Today, as a result of the Yale-Cambridge India Expedition, led in 1935 by H. de Terra in association with T. T. Paterson and P. Teilhard de Chardin, a geological foundation for the study of

Indian prehistory has been laid. The Himalayan Ice Age was studied in south-west Kashmir to understand the Pleistocene stratigraphy of the plains of the Punjab, and a correlation between Himalayan glaciations in the Sind and Liddar valleys and artifact-bearing Pleistocene deposits in the Potwar region was worked out to reach the relationship between Pleistocene geology and prehistory.

Of the studies on the Himalayan Ice Age by early geologists, G. Dainelli's are more intensive. He records four main glaciations, separated from one another by three interglacial stages, in the north-west Himalayas recognized by their moraines. The glacial sequence is as follows: (1) First glaciation. (2) First interglacial stage. (3) Second glaciation. (4) Second interglacial stage. (5) Third glaciation. (6) Third interglacial stage. (7) Fourth glaciation.

Nearly half the area of the valley of Kashmir is occupied by Pleistocene deposits, which are found as low, flat mounds bordering the slopes of the mountains on all sides. These deposits, known as *Karewas* in the Kashmiri language, are composed of boulder gravels and fine sands and clays, which occur in an alternating succession. The *Karewas* are supposed to be the surviving remnants of deposits of a lake which intermittently came into existence during the warm interglacial periods of melting ice and filled the whole valley. The first glacial deposit is the conglomerate overlying the Mangom moraine, the lowest and earliest undoubted morainic deposit composed of large blocks, derived from trap and limestone, and scree-like small chips in a yellow clay matrix. The conglomerate is characterized by small, coarsely rounded pebbles of limestone, quartzite, slaty rocks, and grits cemented by hard calcareous matter. The first interglacial period, succeeding the deposition of the 'cemented conglomerate', saw the inundation of the Kashmir valley by a lake in which were deposited fine sands and clays, forming the lower *Karewa* beds. The boulder gravels of second glacial time and the early second interglacial sediments form the upper *Karewa* beds. The great part of the early second interglacial deposit was eroded during the late second interglacial period, producing a terrace, T1. T2 is of third glacial age; the third terminal moraines are in a fresh state of preservation, which distinguishes them clearly from older glacial deposits. Brown loam and gravel cover the second terrace, which is presumably of fluvio-eolian origin. T3, of third interglacial age, was produced by erosion. Brown loam and gravel also cover the third terrace. But the eolian deposits in this terrace are less than those of the preceding glacial stage. T4, of fourth glacial age, is composed of a thin bed of boulder gravels.

Dainelli tentatively correlates the glacial cycle in the Himalayas with that of the Alps; the first glaciation in the Himalayas is correlated with the Mindel advance in the Alps, the

second with the Riss, the third with the Würm, and the fourth with the post-Würm I. Today, however, as a result of de Terra's studies it is necessary to assign an older age to Dainelli's glacial sequences. In other words, the lower Pleistocene in Kashmir corresponds to the first glacial and interglacial stages, the middle to the second major glaciation and the following long interglacial stage, and the upper to the third and fourth glaciations and the third interglacial stage. According to Dainelli the lower Karewa beds represent the first, or Mindel-Riss, interglacial stage. This means that the beds are of middle Pleistocene age. De Terra's studies show that the beds, as they lie between the first terminal moraines and the second glacial deposits, must belong to the first interglacial stage, but that they are to be assigned to the lower Pleistocene age, because in the lower Karewa beds at Sombur occur the *Elephas* cf. *hysudricus*, a primitive elephant that lived during the earliest part of the Pleistocene period. Again, in de Terra's opinion the fourth glaciation in the Himalayas should not be regarded as a post-Pleistocene stage, because its terminal moraines are succeeded by at least two smaller oscillations recalling the Bühl and Geschnitz advances in the Alps.

From this brief survey of the Pleistocene glacial sequence of the north-west Himalayas we pass on to the Pleistocene geology and prehistory of the Potwar region, an elevated plain lying on the one hand between the foothills of the Kashmir Himalayas and the Salt Range and on the other between the Indus and Jhelum rivers.

The upper Tertiary and lower Pleistocene rocks in the extra-Peninsula, forming the low, outermost hills of the Himalayas from the Indus to the Brahmaputra, are known as the Siwalik system, because they form the Siwalik hills near Hardwar where they were first recognized and in which the first palaeontological records were collected.

The origin of the Siwalik system is ascribed by E. H. Pascoe and G. E. Pilgrim to the flood-plain deposits of a great north-west-flowing river, lying south of and parallel with the Himalayan chain from Assam to the Punjab and flowing southwards into the gradually receding Miocene sea of Sind and the Punjab. This river has been named the 'Siwalik' by Pilgrim and the 'Indo-Brahm' by Pascoe, because it carried at one time the combined discharge of the Brahmaputra, Ganges, and Indus. According to de Terra, however, the Siwalik deposits are the local precipitates of an antecedent slope drainage and not derived from the hypothetical Indo-Brahm river.

The Siwalik hills have yielded fossil remains of a remarkably varied and abundant vertebrate fauna in which the class *Mammalia* preponderate. The first collections were made in the Siwalik hills near Hardwar in the early thirties of the last century. Later, additions were made by discoveries in the other Himalayan

foothills. But it is through Pilgrim's discoveries in the Potwar and Kangra areas in the present century that the homogeneity of the fauna over the whole Siwalik province has been established and a revised correlation of the system has been made.

Of special interest is the discovery of about eleven genera of fossil anthropoid apes in the Siwalik mammal fauna. Since the discovery of the first fossil anthropoid ape in 1836 by H. Falconer and E. Cautley many a scholar thought that the uplift of the Himalayas, which set in during the Tertiary era,¹ determined the evolution of the Siwalik anthropoids.

Now, those forms of the organisms which are most closely related to man are to be found, as all authorities now agree, in the anthropoid group. Hence, if the origin of man be looked upon as the result of evolution rather than of special creation it is to be assumed, especially on the evidence from the dentition, that the Siwalik anthropoids were at least structurally ancestors to the human group.

But in the light of geological investigations carried out by de Terra it appears that the uplift of the Himalayas and the evolution of the Siwalik anthropoids did not coincide. The greatest abundance of the anthropoids of the Siwalik fauna occurred long after the middle Tertiary mountain-making and prior to the Pleistocene uplifts. But no sure traces of anthropoids of the lower Pleistocene period are known, whereas the first records of man appear during the middle Pleistocene; the Siwalik fauna became extinct both by dying out of forms and migration to other regions, such as the Narbada valley of Central India, during the second glaciation.

On palaeontological grounds the Siwalik system is divided into upper, middle, and lower. The upper Siwalik embraces the Boulder conglomerate, Pinjor, and Tatrot stages; the middle the Dhok Pathan and Nagri stages; and the lower the Chinji and Kamlial stages. De Terra has correlated the upper Siwalik stages of the Punjab with the moraines of successive glaciations in the Sind and Liddar valleys of Kashmir.

We now come to the dating of the various stages of the Siwalik system on the basis of palaeontological records. Here,

¹ The Tertiary era is the most important in the physical history of India. It was during this era that two profound physical changes set in, which materially altered the old geography of the Indian region. They are the submergence of the Mesozoic *Lemuria* (the name given to the Indo-Madagascar continent) and the upheaval of the deposits of the sea (the great Tethys of geologists) spreading over an immense tract, now forming the northern zone of the Himalayas, North India, Tibet, and a great part of China. As a result of the foundering of *Lemuria* (the land-bridge between India and Africa) and the growth of the Himalayas the present configuration of the country was outlined. The evidence of an Indo-African land connection is afforded by the unmistakable affinities between the living lower vertebrate fauna of India and that of Central Africa.

we are mainly concerned with the Pliocene and Pleistocene divisions of geological time. But opinion among geologists and palaeontologists differs as to the definition of the Pliocene-Pleistocene boundary. Pilgrim regards the Tatrot and Pinjor stages as of Pliocene age, and refers the Boulder conglomerate stage to the lower Pleistocene. W. D. Mathew and E. H. Colbert consider the upper Siwalik stages as of Pleistocene, 'very probably of lower Pleistocene age'. De Terra, following E. Haug's definition of the Pleistocene period which states that it is the period marked by the appearance for the first time of true elephants, true horses, and true oxen, considers the lower and middle Siwaliks as mainly of Pliocene age, and refers the Tatrot stage to the first glacial, the Pinjor to the first interglacial, and the Boulder conglomerate to the second glacial age. The mammal fauna of the Tatrot stage is poorer than that of the overlying Dhok Pathan and underlying Pinjor stages. Again, in the Tatrot stage occur elephants, pigs, and bovids, which are more easily adapted to climatic changes than the Rhinocerotidae or anthropoid apes. Distinct fossil remains of the latter are not found in the Tatrot stage. Again, most of the fossil remains of *Hippopotamus*, a climatically specialized type, are found in Pinjor beds rather than in basal Pleistocene strata. Thus in Tatrot time conditions were less favourable for land mammals due to the first glaciation. The fauna of the Pinjor stage is more or less similar to, but greater in number than, that of the Tatrot stage. In the Boulder conglomerate stage, in which the fauna is very poor compared with that of the underlying Pinjor stage, occur *Equus namadicus* and *Bubalus palaeindicus*, which are found in the middle Pleistocene of the Narbada valley of Central India.

In the Punjab, in second interglacial time, the Boulder conglomerate rock was eroded, leaving a terrace, T1. The surface of T1 is covered with redistributed Boulder conglomerate, which in places became cemented together. T2, of third glacial age, is composed of a conglomerate capped by a mantle of yellow and pinkish silt. This silt is the 'loess' of earlier writers and the 'Potwar loessic silt' of de Terra. T3 was produced by erosion during third interglacial time. It has a basal gravel covered by redeposited Potwar. T4, of fourth glacial time, is composed of gravel, and T5 is later than fourth glacial age.

The two important areas in north-west India where the Yale-Cambridge India Expedition of 1935 made extensive collections of palaeolithic implements in association with datable Pleistocene deposits are the Soan valley and the Indus river from Attock to the junction with the Soan.

The earliest tools, which come from the upper portion of the Boulder conglomerate at Chaomukh, Kallar, Adial, Jammu, and Malakpur, comprise large crude flakes of quartzite and slate. They are rolled, which suggests that they were made during the deposition of conglomerate. The upper surface is usually unflaked

save for one or two small irregular scars. The edges are often battered, either by use or by natural agency. These large crude flake tools of second glacial age have resemblances to the Cromerian of Europe.

At Khushalgarh, Makhad, and Injra on the Indus and at Garijala which is south-east of Attock at the outlet of the Haro river into the Indus, well-patinated pebble and flake tools, worn and fresh, were found on the surface of T1. Now, tools patinated like those from the surface of T1 and boulders were found in a rolled condition in the gravels of T2. Therefore, the tools from the surface of T1 appear to be earlier than those found in the gravels of T2. Hence, T1 is of second interglacial age and T2 of the third glacial.

The tools from the Indus region form a distinct group, and are termed the 'early Soan' by Paterson in contrast to the industry found widespread along the Soan valley to which the same 'Soan industry' has been given by de Terra and which Paterson called the 'late Soan'. The early Soan industry is divided into three groups, termed A, B and C, based on patination and state of wear. The tools of Group A are heavily patinated, deep brown or purple, and much worn. The tools of Group B are as patinated as those of Group A, but they are unworn. The tools of Group C are less patinated and fairly fresh.

The pebble tools, which are all made from thoroughly rounded, water-worn pebbles and small boulders, are of two types. The flat-based specimens are portions of pebbles, one side flat or nearly so, produced artificially or by natural agency. From the flat face flakes were struck off steeply towards the upper rounded surface, resulting in a strong working edge which is usually convex and sometimes straight but never concave. The working edge may be all around the pebble or only partly around. In the case of rounded-pebble tools the flakes were struck off from the original pebble surface and not from flake surface. The pebble tools, circular, boat-shaped, or oval, become finer in the later stages.

The flake tools, which are made of quartzite and trap, are at first Clactonian-like in appearance but have resemblances to the proto-Levalloisian forms in the later stages.

The early Soan A tools include pebbles only. The early Soan B and C tools comprise both pebbles and flakes. The flakes in Group B resemble the Clactonian forms, while those in Group C are of proto-Levalloisian forms.

Of the same second interglacial age are rolled tools, comprising handaxes, cores, and flakes, found in gravels of the third glacial age. The handaxes are of Abbevillian and early, middle, and late Acheulean types. The Abbevillian handaxes are more rolled than the early Acheulean. The middle Acheulean handaxes have been found in a gravel which is correlated with that on the terrace T1. They are slightly rolled. But unworn examples

occur at a site on the Soan, which was discovered in 1937 by E. S. Pinfold.

The late Soan industry is of third glacial age. In it flake tools and cores are more dominant than pebble tools. It is divided into two groups. In the earlier, A, the flakes and cores are of early Levalloisian forms, while in later, B, the flakes and cores have resemblances to the late Levalloisian forms.

In third interglacial time erosion was widespread, which led to the redeposition of all earlier industries in T3. At Chauntra de Terra and Teilhard found in a gravel that may be of third interglacial age an assemblage of tools. The tools comprise one or two very worn Abbevillian handaxes and one or two large flakes resembling those from the Boulder conglomerate; less worn early and middle Acheulean handaxes; and fresh, late Acheulean handaxes and late Soan flakes and cores.

At Dhok Pathan on a high terrace has been found a series of pebble tools and flakes. This series may be of fourth glacial age, judging from typology and state of preservation. Another site, a few miles from Dhok Pathan, yielding similar tools is Pindi Gheb. This site was discovered in 1930 by K. R. U. Todd.

In the Narbada valley between Hoshangabad and Narsinghpur de Terra and Teilhard carried out investigations. Here W. Theobald had studied the stratigraphy of the ancient alluvial deposits. At his time the deposits were considered of Pliocene age. Hackett had discovered a handaxe, embedded in the reddish clay of the upper group, in association with fossil vertebrate remains, and several finds of flake stones were made in the surface deposits. Theobald had mentioned a human cranium, supposed to have come from the conglomerate bone bed of the lower group. He listed it as *Homo sapiens*, which strongly suggests that it was collected from the surface deposits in which de Terra and Teilhard found protoneolithic tools. R. D. Oldham had pointed out that beneath the lower group lay laterite gravel and laterite soil. Pilgrim had proved that the beds were of Pleistocene age. De Terra and Teilhard established the association of early palaeolithic tools with a middle Pleistocene type of fauna, and suggested a correlation between the Narbada sequence and the Punjab Pleistocene.

The ancient alluvium of the Narbada is composed of three sedimentary phases, the lower and upper groups and the cotton soil or regur. In addition, beneath the lower group lies a thick deposit of laterite capped by a thin laterite gravel. The lower group begins with a coarse cemented conglomerate of gravels and sands, ranging in thickness between 3 and 11 feet. De Terra and Teilhard collected and chiseled out from the conglomerate large flakes, resembling the pre-Soan artifacts of north-west India, handaxes of Abbevillian, early Acheulean, and middle Acheulean types, and cores, most of which were heavily

rolled. They collected also fossil remains of *Hexaprotodon namadicus* and *Bos* sp. from the very base of the lower group. Conformable on the conglomerate is a red silty clay with lime concretions, measuring 25 to 32 feet in thickness. From the red clay de Terra and Teilhard collected unrolled Clactonian flakes and late Acheulean handaxes. In view of the fact that the lower Narbada group contains heavily rolled Abbevillian and fresh late Acheulean handaxes, which appear in the Punjab connected with the stages younger than the Boulder conglomerate, de Terra and Teilhard are inclined to equate the lower Narbada group with T1-T2 in the Punjab.

The fossil vertebrate fauna collected by de Terra and Teilhard from the base of the upper Narbada group includes *Elephas namadicus*, *Equus namadicus*, *Hexaprotodon namadicus*, *Bos namadicus*, *Bubalus palaeindicus*, *Sus* sp., *Trionyx* sp., and *Emys* sp. To this list may be added the following types of the vertebrate fauna from earlier collections preserved in the Indian Museum of Calcutta. They are *Ursus namadicus*, *Leptobos frazeri*, *Cervus duvancelli*, *Rhinoceros unicornis*, *Stegodon insignis*, *Stegodon ganesa*, *Hippopotamus palaeindicus*, *Pangura tectus* Bell and other Reptilia.

The fauna of the upper group is of middle Pleistocene type, except for *Leptobos* and *Stegodon* which occur in the Pinjor zone of the upper Siwalik series and hence are of lower Pleistocene age. But according to Teilhard, who critically examined these specimens in Calcutta, the *Leptobos* may well be a damaged skull of *Bos*, and the tusks or fragments of *Stegodon* are too imperfect to allow even generic specifications.

Thus it may be stated that the fossil fauna of the upper group is similar to that of the lower group and that both groups carry middle Pleistocene mammal remains.

The basal gravels and sands of the upper group are less cemented and less coarse than those of the lower group. Above this bed, which measures 15 to 30 feet thick, lies a clay bed of 30 to 70 feet thick. The clay is less red, poorer in concretions, and more silty compared with the older clay. In both gravels and pink clays occur flakes and cores of late Soan type, rolled and otherwise. Rolled early Acheulean handaxes are found in the basal gravels and sands and not in pink clays, which shows that they were redeposited from the lower group. The upper Narbada group may be correlated with T3-T4 in the Punjab.

Above the clay of the upper group is a soft bed of gravels and sands in which de Terra and Teilhard collected small blades and scrapers. These tools are made of flint or jasper and not of trap or quartzite from which the tools of the upper and lower groups were made. No handaxes or large cores were found. The small blades and scrapers show a total change both in technique and in material, and hence may be regarded as representing a

protoneolithic industry. The alluvium of the regur or cotton soil may be equated with T5 in the Punjab.

Paterson studied the terrace geology and archaeology of the region near Madras. In 1930 L. A. Cammiade and M. C. Burkitt had classified the old Stone Age artifacts of south-east India, collected by Cammiade, into four series belonging to four distinct cultures of early paleolithic to protoneolithic times, determined on stratigraphical and typological grounds, and also judging by their state of preservation. The earliest industries comprise handaxes of quartzite. They are rolled, but not heavily. One type, represented at Chodavaram and in the Bhavanasi gravels, recalls the rostrocarinate. It is the type of tool which was first recognized at Victoria West in South Africa. Next are flake industries. Industries of the third series, best found in sites at the eastern and western end of the Nandi-Kanama Pass, comprise blades, burins, planing tools, and end scrapers. Lastly, microlithic industries occur, pigmy tools being dominant. They are found on the surface of the ground near the Godavari river. The pigmy tools recall those of the Wilton culture of South Africa. According to Cammiade, who recognized a series of oscillations from pluvial to interpluvial in the climate of south-east India by observations made at a number of sites, the industries of the first series from pebble beds are associated with a long dry period following a long damp period which was marked by the formation of laterite on the east coast of India between the rivers Kistna and Palar, and those of the second series from red clay with the second dry period following a period of violent rain which led to the formation of detrital beds. The third wet period differs from periods 1 and 2 in that neither laterite was formed nor the rain-wash was violent. Lastly, a period of less rainfall was followed by a period of denudation. Industries of the third and fourth series are associated with these periods. The series 3 industries occur on the surface of red clay overlain by red sandy soil.

Paterson recognized four terrace surfaces, designated TD, T1, T2, and T3, in the Korttalaiyar valley. On the gneissic surface, an old marine platform of pre-Pleistocene age, lies the white boulder conglomerate, a fluvatile deposit which is probably of middle Pleistocene age. The overlying detrital laterite forms surface TD. The laterite was eroded, producing T1 which was mantled by some little deposits of boulder gravels and sands. This was followed by erosion to T2 on which thicker gravels were deposited and then covered by silts and sands. T3 was cut into these and forms a small terrace alluvium.

At Vadamadurai, in a tank dug up, palaeolithic implements comprising handaxes, cores, and flakes were discovered by Paterson. They are divided into three groups. The implements of the first group, heavily patinated and most of them rolled, are of pre-laterite age; they have been found in the white boulder

conglomerate. The second group has been found in the laterite on top of the conglomerate. The implements of the first group show a very deep whitish crust in consonance with the colour of the boulder conglomerate pebbles, while those of the second group are stained red through contact with the laterite gravel. The third group, the implements of which have no laterite staining and little patination, belongs to the gravels of T1.

The first group is divided into an early and a late series on grounds of patination and typology. The handaxes, cores, and flakes of the early series are heavily patinated. The handaxes are of Abbevillian type. They are very crude and irregular in outline. The cores, mostly oblong or circular, show rough, irregular flaking. The flakes have primary flaking of a very primitive type on the upper surface. The implements of the late series are less heavily patinated. The handaxes are of early Acheulean type, and show the beginnings of a step flaking technique. They are slightly more regular in form. The cores, mostly discoidal, show fairly regular alternate flaking. The flakes have more primary flaking than in the previous stage.

The handaxes of the second group resemble the middle Acheulean. They have considerably more step flaking. They are much more regular in form, and the common forms are pear-shaped and ovate. The cores, mainly discoidal, have more regular flaking. The flakes show primary flaking covering the upper surface.

The handaxes of the third group are of late Acheulean type. There are two forms, one comprising ovates with step flaking and the other consisting of long pointed forms with free flaking. The cores are discoidal. There is also a flat type of core, oblong, oval, or square, with a platform at one or both ends for removing flakes from one surface. The flakes show no faceting on the platform. They are thin, and a few show retouch for use, probably, as side scrapers.

Late Acheulean handaxes, cores, and flakes, similar to those of the third group from Vadamadurai Tank have been found at Giddalore in the Kurnool district. At Attirampakkam, near Madras, have been found late Acheulean handaxes and cleavers, several of them being in place in the basal laterite gravel of T2. A few rolled specimens correspond typologically to the implements of the first two groups from Vadamadurai Tank. But the very great majority are unrolled, and they are probably to be assigned to the age of the third Vadamadurai group.

Quite recently, in 1942, an expedition sponsored by the Archaeological Survey of India and the Gujarat Research Society explored the Sabarmati, Orsang,¹ and Narbada valleys. H. D. Sankalia of the Deccan College Post-Graduate and Research Institute, A. S. Gadre of the Archaeological Department of the

¹ A tributary of the Narbada.

Baroda State, B. K. Chatterji, and V. D. Krishnaswami participated in this expedition. A short article entitled 'In search of Early Man along the Sabarmati', embodying the results of the expedition, has been written and published by Sankalia,¹ the leader of the expedition. But in the said article the geological and archaeological results of the expedition have not been properly dealt with. In the Sabarmati valley, as the writer understands, Chatterji and Krishnaswami collected and chiseled out quartzite handaxes from conglomerate overlying a solid granite bed. They collected also microliths, made of flint or jasper, from cotton soil. But in the upper layers of the cotton soil microliths were associated with potsherds, whereas in the lower layers pottery was entirely absent. The discoveries made in the Sabarmati valley appear to be in consonance with that we expect; the geological, palaeontological, and archaeological history of Pleistocene time not only in the Sabarmati valley but also in the Godavari, Jamuna, and Ganges valleys must agree with that in the Narbada valley. As in the Narbada valley, in the Godavari valley and in the valleys of the Jamuna and Ganges a middle Pleistocene type of fauna has been found. Skulls and bones of *Elephas namadicus*, bovine bones, a jaw of hippopotamus, and a single tooth of *Equus namadicus* have been found in the Godavari valley, and in the valleys of the Jamuna and Ganges near Allahabad occur the following: *Semnopithecus* sp., *Elephas namadicus*, *Mus* sp., *Hippopotamus palaeindicus*, *Equus* sp., *Sus* sp., *Cervus* sp., *Bubalus palaeindicus*, *Bos namadicus*, and *Antelope* sp. In the Sabarmati valley, however, fossil remains of middle Pleistocene mammals remain yet to be found.

From the preceding facts we may conclude as follows: (1) The earliest industry in north-west India is represented by pre-Soan flakes of Cromerian type. It is of second glacial age. (2) The earliest industry in south-east India comprises handaxes of Abbevillian type. (3) In the Narbada valley the earliest tools, found in association with a middle Pleistocene type of fauna, are Abbevillian handaxes and pre-Soan flakes. (4) In north-west India the second interglacial industries comprise Abbevillian and early Acheulean handaxes and early Soan flakes of Clactonian and proto-Levalloisian forms. Of third glacial age are late Soan's flakes of Levalloisian type. (5) The handaxes found in north-west India and the Narbada valley typologically resemble the handaxe technique of south-east India. (6) Thus it seems very probable that the handaxe peoples came from south-east India to the Narbada valley and north-west India.

Now, de Terra says: 'This race' (the handaxe peoples of south-east India) 'also may have brought to the north a special tradition of tool manufacture to which I have given the name

¹ *Journal of the Gujarat Research Society*, Vol. V, April 1943, No. 2, pp. 75-86.

Soan culture.' But the writer objects to this statement, for the Soanian clearly belongs to the flake group. Oswald Menghin has put forth the theory that there were three belts of palaeolithic, or, as he prefers to say, protolithic, civilization in the Old World: in the north bone culture, in the centre flake culture, and in the south handaxe culture. Switzerland, Austria, Germany, and Czechoslovakia, where sites of bone culture have been uncovered, belong to the northern part of the Old World; Russia and the central portion of Asia to the middle part; and Africa and India to the southern part. Menghin is inclined to locate the original home of the flake culture somewhere in China or Turkestan and that of the handaxe culture in Africa. Regarding the question of the cradle of the flake culture the writer would bring north-west India within the central belt of the Old World, and suggest that the Caucasus and north-west India were the two earliest centres of the flake culture. This is because civilization began in the Near East not only in Mesopotamia and Egypt but also, and probably earlier, in north-west India and the Caucasus.¹

As mentioned above, pigmy tools representing a protoneolithic industry occur in the Sabarmati, Narbada, and Godavari valleys. Such tools were also found in the alluvial basin of the Orsang river by Bruce Foote, in the Vindhya region, in the caves of Padan near Bombay, and in a rock shelter situated in the valley known as Dorothy Deep about two miles W.N.W. of Pachmarhi in the Mahadeo hills.² To the protoneolithic industry belong also the implements found at Sukkur and Rohri on the Lower Indus in Upper Sind. On the limestone hills in both localities de Terra found conical cores and very thin long blades of flint which, to judge from typology and the state of preservation, resemble those of Mohenjodaro. But at Sukkur and Rohri the implements were not found associated with pottery and metal. This suggests that the industries of Sukkur and Rohri are earlier than the industry of Mohenjodaro. Also, from a geological angle the greater antiquity of the industries of Sukkur and Rohri seems clear. Ancient soils of 'terra rossa' type occur on the limestone hills of Sukkur and Rohri. They are buried on the hill slopes under ancient Indus silt. In both red soils and silt occur flint cores and blades. Now, it is at a time of greater rainfall and not under present arid conditions that

¹ For the Caucasus as one of the earliest centres of civilization see my 'The Origins of Civilization in Egypt' in the *Journal of the University of Bombay*, Vol. XII, Part I, July, 1943.

² In the Dorothy Deep rock-shelter No. 1, G. R. Hunter excavated microliths only from the lower layers and microliths associated with pottery from the upper layers. He excavated also a skeleton in association with microliths from the lower layers. Pottery was entirely absent not merely at the level of the skeleton, 18"-21", but for a further 10" above it. The surface soil down to 6" yielded pottery in abundance.

red soils form. The Indus valley civilization flourished also at a time of greater rainfall. But the formation of red soils on the limestone hills and the construction of Mohenjodaro do not appear to have belonged to the same climatic phase. A higher Indus level at Sukkur, as attested by the silt on the hill slopes, necessitated also a higher flood plain at Mohenjodaro. But the flood plain at Mohenjodaro was not higher. The discovery of the ruins of Mohenjodaro nearly thirty feet below the present valley flat indicates a geological interval between the formation of the ancient silt and the construction of Mohenjodaro, during which the river deepened its channel. Hence we are inclined to adopt the view that the first Indian urban civilization represented at Mohenjodaro, Harappa, Chanhudaro, and other chalcolithic sites on the Indus evolved out of the protoneolithic culture represented at Sukkur and Rohri.

We now pass on to the new Stone Age in India. In 1861 H. P. Le Mesurier drew attention to certain ground and polished stone implements, which he in 1860 had found in the valley of the East Tons river in the United Provinces. In 1862 W. Theobald collected similar artifacts from the Banda district of the United Provinces. These stone implements are neoliths. But they were not recognized as such then. About 1866 numerous flint cores and flakes were discovered on the hills near Sukkur and Rohri in Upper Sind and from the bed of the Indus nearby. W. T. Blandford considered the cores 'by far the most carefully formed of any hitherto found in India'. Further, he suggested that the core-makers were different from the flake-makers, the latter representing a more advanced civilization. Blandford apparently regarded the implements of Sukkur and Rohri different from those of the Tons valley and Banda. In this, as we have seen above, he was right. The first discovery of neolithic implements, recognized as such, was made by W. Fraser about 1872 on the North and Peacock hills in the Bellary district of the Madras Presidency. Later, Bruce Foote made large finds of such artifacts in this district. He collected also neolithic implements from numerous sites in the northern part of the Anantapur district of the Madras Presidency. In 1876 F. Fedden picked up a flint scraper at Jhirak in Lower Sind, and in 1879 J. Cockburn described neoliths collected from the Khasi hills in Assam, the Banda district, and the Vellore taluq in the North Arcot district of the Madras Presidency. In 1879 W. Theobald picked up a celt of limestone with pointed butt and rounded edge from the bank of the Indus river near Attock. It is the first specimen of its kind to be discovered in the Punjab. W. H. P. Driver in 1887 discovered a neolithic settlement near Ranchi. Among the stone implements found by him we can recognize celts, arrow-heads, discs, polishers, and grinders. Since then neolithic implements have been collected from other districts in Chota Nagpur; C. W. Anderson in 1915 made in the valleys of

the Sanjai and Binjai rivers in Singbhum an interesting collection of implements representing late palaeolithic and neolithic industries. Neoliths have been collected also from the Salem (e.g., on the Sheveroy hills) and Guntur (e.g., at Amaravati) districts of the Madras Presidency, from Gujarat (e.g., in the Sabarmati valley), and from the Central Provinces and the Assam Province. In the Tezpur district in Assam was found a shouldered celt of the Burmese type. A similar implement was found also in Dalbhum (Chota Nagpur) by V. Ball. The neolithic celts from the Central Provinces are similar to those from the United Provinces.

We shall now mention the neolithic discoveries made by the Yale-Cambridge India Expedition of 1935. In the central Salt Range, near Uchali and south-east of Rawalpindi, de Terra found human burials in postglacial loessic soil. The burials yielded skulls of *Homo Sapiens* of dolichocephalic type and handmade pottery. No stone implements were found. But at Uchali, west of Naushahra, a burial containing handmade pottery was found associated with implement-bearing layers. The implements comprised flakes and cores reminiscent of palaeolithic technique. Similar flakes and cores were found by Chr. and J. Hawkes in a postglacial terrace on the Jhelum river near Pampur. Both de Terra and Paterson made also similar finds associated with potsherds in alluvial deposits on the banks of the Jhelum as well as in lake-terrace sites of neolithic age. The megalithic site of Burzahom, between Srinagar and Gandarbal, yielded flakes and cores which are presumably waste products of hoes, pestles, and polished celts found at depths ranging from 2 to 10 feet. At Burzahom a trial excavation made by de Terra disclosed three culture layers. The uppermost layer (A) represented a Buddhist site of the fourth century A.D. Below it was a layer (B) with highly polished black ware and potsherds with incised geometric designs. This culture layer no doubt belongs to the last phase of the Indus valley civilization known as the Jhangar stage from the site of Jhangar, near Lake Manchar, in Sind where it is best represented. At seven feet from the terrace surface occurred charcoal, polished celts, bone awls, and cooking pots in postglacial loessic soil. Paterson uncovered also a similar 'kitchen' settlement at Nunar, above Gandarbal, also at seven feet below the terrace surface.

It would seem from the preceding that the neolithians of India were principally tool-makers and hence culturally inferior to the neolithic Egyptians who knew, in addition to tool-making, agriculture, domestication of animals, manufacture of pottery, and textile industry. Yet, India possessed a civilization fully equal to that of Egypt or Mesopotamia about 3400 B.C. The foreign derivation of the first Indian urban civilization at Mohenjodaro cannot be stressed in view of its connection with the protoneolithic culture at Sukkur and Rohri. Besides, going

PERIOD.			N.W. INDIA.		C. INDIA.	S.E. INDIA.
HOLOCENE.	Postglacial stage.	Chalcolithic.	Mohenjodaro.			
		Neolithic.	Amri.			
		Protoneolithic.	Kitchen settlement of Burzahom and burial of Uchali.			
			Industries of Sukkur and Rohri.		Microoliths from cotton soil.	Microoliths of the Godavari valley and the Nandi-Kanama Pass.
UPPER PLEISTOCENE.	Fourth glaciation.	Upper palaeolithic.	Industries of Dhok Pathan and Pindi Gheb.			
	Third interglacial stage.		Late Soan industry.		Flakes and cores of late Soan type from upper gravels.	Blades and burins of the Nandi-Kanama Pass.
	Third glaciation.					
	Second interglacial stage.	Lower to middle palaeolithic.	Abbevillio-Acheulean and early Soan industries.		Pre-Soan and Abbevillio-Acheulean industries from lower gravels.	Handaxes of late Acheulean type, cores, and flakes of post-laterite age.
MIDDLE PLEISTOCENE			Pre-Soan flake industry from top of the Upper Siwalik Boulder conglomerate.			Handaxes of middle Acheulean type, cores, and flakes of laterite age.
	Second glaciation.					Handaxes of Abbevillian and early Acheulean types, cores, and flakes of pre-laterite age from white boulder conglomerate.

backwards from 3400 B.C. a correlation of the civilizations of the Indus and Tigris-Euphrates valleys can be made out. The Mohenjodaro period corresponds to the early dynastic period of Mesopotamia, and the Anri to the Jemdet Nasr. Stages corresponding to the Uruk and al'Ubaid phases of Mesopotamian civilization remain yet to be found in India. If systematic explorations were undertaken in the Indus valley and its border lands, as in the Nile and Tigris-Euphrates valleys, no doubt our extremely meagre knowledge of the neolithic period in India could be enlarged and the gaps between the chalcolithic and neolithic periods filled up. During 1929-30 and 1930-31 a survey of Sind was carried out by N. G. Majumdar. In course of this Majumdar discovered the Anri phase of the Indus valley civilization. In October 1939 he began further exploration in Sind. But he was killed in November of that year while on exploration duty on the Sind frontier. So far no account of this exploration has been published by the Archaeological Survey of India. It is true that the preparation of such an account will involve many a difficulty. But it is worth making an attempt at it in view of the possibility of obtaining new information on the beginnings of civilization in India.

The Stone Age cultures, belonging to the middle Pleistocene and the early part of recent times, in north-west and peninsular India and the Narbada valley of Central India are summarized in the foregoing table.

REFERENCES.

- Brown, J. Coggin—Catalogue of prehistoric antiquities in the Indian Museum at Calcutta, 1917.
- Cammiade, L. A., and M. C. Burkitt—Fresh light on the Stone Ages in south-east India: *Antiquity*, Vol. IV, 1930.
- Chakravarti, S. N.—The prehistoric periods in India: *Journal of the University of Bombay*, Vol. X, Part 1, July, 1941.
- Chakravarti, S. N.—The origins of civilization in Mesopotamia: *Journal of the University of Bombay*, Vol. XI, Part 1, July, 1942.
- Chakravarti, S. N.—The origins of civilization in Egypt: *Journal of the University of Bombay*, Vol. XII, Part 1, July, 1943.
- Das Gupta, H. C.—Bibliography of prehistoric Indian antiquities: *Journal of the Asiatic Society of Bengal*, N.S., Vol. XXVII, 1931, No. 1.
- De Terra, H.—The Siwaliks of India and early man: *Early Man*, 1939.
- De Terra, H. and T. T. Paterson—Studies on the Ice Age in India and associated human cultures, 1939.
- Foote, R. Bruce—Indian prehistoric and protohistoric antiquities, 1916.
- Gregory, William K. and Milo Hellman—The evidence of the dentition on the origin of man: *Early Man*, 1939.
- Hunter, G. R.—Interim report on an excavation in the Mahadeo Hills: *Nagpur University Journal*, December 1935, No. 1.
- Majumdar, N. G.—Prehistoric and protohistoric civilization: *Revealing India's past*, 1939.
- Majumdar, N. G.—Explorations in Sind: *India Archaeological Survey Memoirs*, No. 48, 1934.
- Menghin, Oswald—Origin and development of the early palaeolithic cultures: *Early Man*, 1939.

Pilgrim, G. E.—On the occurrence of *Elephas antiquus* (*namadicus*) in the Godavari alluvium, with remarks on the species, its distribution, and the age of the associated Indian deposits: *India Geological Survey Records*, Vol. 32, 1905.

Theobald, W.—On the Tertiary and alluvial deposits of the central portion of the Nerbudda valley: *India Geological Survey Memoirs*, Vol. 2, 1860.

Wadia, D. N.—Geology of India, 1939.

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Note.—In 1940 the Anthropology Department of the Calcutta University in collaboration with the Archaeology Department of Mayurbhanj State carried out excavations in the neighbourhood of Kuliana where some palaeoliths had been discovered in 1939 in the bed of tanks dug by the State Public Works Department. The country rock is Archaean in age and the detrital laterite in which the stone implements are found embedded are derived from these rocks. The thickness of the laterite beds varies from two feet to more than thirteen feet in places. Samples of laterites from different depths were analyzed to ascertain if the whole could be broken up into subdivisions differentiated from one another by their heavy mineral content. The result was negative. No fossils were found in the laterite beds. They, however, overlie, by a considerable height, certain fossiliferous calcareous clay beds near Baripada which are known to be of middle Miocene age. The beds are therefore post-miocene.

The tools belong to the following families:—

- A. Pebble tools, some of which resemble crude hand-axes, and others cleavers. There are also choppers, ovate forms and awl-like pointed tools.
- B. Core tools, both faces worked—
 - (i) Peariform and sharply pointed triangular forms.
 - (ii) Almond shaped, with (a) worked and (b) unworked butts.
 - (iii) Discs and choppers.
 - (iv) Ovate, i.e. with convex cutting edges, (a) worked and (b) unworked butts.
 - (v) Cleaver with transverse cutting edge, (a) pointed butt, (b) square butt.
 - (vi) Cleaver with convex cutting edge.
 - (vii) Cleaver with oblique cutting edge.
 - (viii) A new type of cleaver-like tool with lateral margins alternately chipped to yield working edges, anterior blunt.
 - (ix) Side-scrapers with both faces worked all over.

C. Flake tools (one side unworked)—

- (i) Cleaver on flake, transverse, convex and oblique edged.
- (ii) Chopper on flake.
- (iii) Tool with serrated margin produced by one-sided flaking.
- (iv) Scrapers, with unprepared striking platform (none is with prepared striking platform).

D. Cores—

- (i) Used only as a source of flakes.

All the above tools are of quartzite, ranging from a comparatively easily weathered siliceous sandstone to crystalline varieties and flaggy or chertlike specimens. Many implements, even when found on the surface in the neighbourhood of gravel pits, show ferruginous (lateritic) incrustations on their surface or in the angles between flake-surfaces, proving that they must have been dug up from within the lateritized gravel beds.

K. P. CHATTOPADHYAY.

REVIEWS OF BOOKS

MAGADHA ARCHITECTURE AND CULTURE. By S. C. CHATTERJEE.
Published by the University of Calcutta. Price Rs.5.

It is possible to read in Sris Chandra Chatterjee's 'Magadha Architecture and Culture' (University of Calcutta) not only a sympathetic account of the buildings of the Buddhist Holy Land, but also to gain some idea of the intense enthusiasm of its author for the building art of his motherland. Beginning with a scholarly 'Foreword' by Dr. Syama Prasad Mookerjee, in which the author and his production are suitably presented, this is followed by an Introduction by Sir Sarvapalli Radhakrishnan who explains in a concise manner the objects of the work. From a Preface by the Sthapatya-Visarad, a title to which the author is fully qualified by his experience not only as an architect, but also as a Civil Engineer, Mr. Chatterjee passes on to a chapter on the historical aspect of his subject. Here is a fine opportunity to take an expansive view of the events which led up to the great days of Magadha, a region which corresponds in some of its geographical limits with the modern country of Bihar. Dwelling on the antiquity of its culture, the author then refers to the splendour of its past as shown in the ancient capitals of Rajagriha and Pataliputra. The influence of the Indus Valley Culture then comes into the picture, followed by the effect of the Hellenistic art of Greece through Bactria and Gandhara in the early centuries of the Christian era. And so the story is continued through the ages, of Mahavira and Gautama Buddha, of Asoka, to whom Indian architecture owes its genesis, to the Guptas and the Palas, all active patrons of the arts, finishing with the 'Glory of Nalanda' that great Hindu-Buddhist University which flourished in the first millennium and spread its influence over so much of Asia and the East.

Section II of the work deals with the 'Message of Magadha', and the effect of this living culture on the subsequent ages. Gradually the author leads up to the more recent times eventually treating with 'the Modern Architecture in Magadha', on which he makes some illuminating remarks. In conclusion the agencies for resuscitating the architectural art of Magadha are discussed, in other words, the future outlook of this historical school of the building art.

The author has thrown himself into the study of this interesting subject with great energy, and produced much that is thought-provoking. He illustrates his arguments with a number of plates from the primitive structure of the Cyclopean Wall at Rajagriha through many of the phases through which Indian

architecture has passed, finally producing a series of designs associated with the buildings of modern times, which although some may not entirely approve of his excursions into historic styles, the fact that the effort is being made to adapt the past with the present is something more than praiseworthy, it is essential to our well-being.

PERCY BROWN.

SCIENCE CAUSE AND GOD. By J. B. FREEMAN. Ave Maria Press, Chingleput, 1942, pp. i-iv, 210; i-x. Price Rs.5 or 7s. 6d.

The book under review may be called one for all those interested in modern philosophical speculations. It is an attempt to set men thinking and is itself full of thought, though set in a bit loosely.

The author is no doubt abreast with the most recent advances in science, which he discusses and utilizes in his analysis of the concept of cause, which leads on to that of God, the uncaused cause of the universe.

In his treatment of the Axiom of Realism, Analysis of Cause, the Will, Intelligibility, Kinds of Causes, the Principle of Causality, Causal Efficacy, the Apprehension of Cause, Indeterminism, Freedom, Causality, Scientific and Metaphysical Cause, the Ascent, Hume and Cause, After Hume, Religion, Philosophy, Science and other allied topics, the author has made bold not to follow the beaten track but place his original views on record as good as he could, although we cannot agree with him in every detail. The book is useful in spite of certain misprints, that have crept in. To observe critically the popular view of a cause is that it is a power or force which produces or originates the effect. Physical science improves upon this popular view and interprets causality in the light of the doctrine of conservation of energy. The Empiricist argues that we never apprehend a force or energy or power in our sense-experience since all our knowledge is derived from experience. We know nothing of production and necessary connection between the cause and the effect. All that we experience is merely a succession of phenomena. Now, if in our experience, one phenomenon is uniformly or invariably followed by another, the ideas of them become associated in our minds so that whenever we think of the former, we cannot but expect the latter. Thus causality is nothing more than uniformity of order among events and the cause is nothing but the invariable antecedent of an event. This is Hume's definition of a cause. But in that case, day would be the cause of night, as it is invariably followed by night. So Mill defines a cause as an *unconditional, invariable antecedent* of an event. Thus Mill attempts to prove the law of causation on the basis of induction by simple enumeration. While attempting

to prove that the principle of causation is derived from experience, he is compelled to assume that it is found in the facts to make induction possible. But Hume had clearly pointed out that the causal connection could not be found in the facts of experience. The Empiricists first read it into the facts before extracting it from them. Hence, the fallacy is obvious. On strictly experiential grounds the causal connection turns out a mere 'fiction'. Experience furnishes us with no ground whatsoever to extract the principle of causation.

If causality cannot be derived from experience, it must be explained as an *a priori* principle. Kant holds that there is no causality in the reality in itself behind and beyond phenomena. It is real only within the range of experience. It is an *a priori* category of the understanding which the mind evolves from within itself, in order to understand and interpret our experience.

According to Hegel, causality is not only a category of the human mind, but also a category or the framework of reality, which is the objective expression of the Absolute. According to the Intuitionists (Martinean and others) causality does not consist in mere uniformity of sequence, as empiricism holds, nor is it an *a priori* category of the understanding having no objective counterpart in nature, as Kant supposes. It is a power or force which produces the effect. Thus the Intuitionists' view agrees with the popular view.

According to Pragmatism causation is neither derived from experience nor from the necessity of reason but from postulation.

NARENDRA CH. VEDANTATIRTHA.

GEOGRAPHICAL FACTORS IN ARABIAN LIFE AND HISTORY.

By SH. INAYATULLAH. Published by M. Ashraf, Lahore, 1942. Price Rs.4-8-0.

The book provides an enquiry into the influence of physico-geographical environment upon Arabian life and institutions. The need for such a work has been felt for a long time and the author has made a useful contribution to the study of Arabian history and human geography. Though for over a century historians and orientalists have devoted much attention to the Arabic language, general history and the rise and development of the Islamic civilization, yet a systematic geographical survey of the peninsula has not been easy to compile, because of the inaccessible nature of the land and the deep prejudice of its inhabitants against foreigners. Therefore the knowledge of the climatic and physical conditions of the country has mainly been derived from the accounts of the various travellers and explorers (mostly incognito in the past) almost exclusively western who have visited different parts of Arabia at different times. In the

present work, in the earlier part an attempt has been made to trace some general effects of the insular and inter-continental aspects of the location of Arabia in the history, race and languages of its people and the later portions deal with some aspects of the political life of the Arabs, which seem to have been influenced directly or indirectly by the physical conditions of their land. The concept of the environmental influence, including climate, physical aspects, location and natural resources has been fully brought out and the author aptly remarks, 'Not only does geography make clear to us historical facts and events, by giving us topographical and other information about the places, with which they are connected; but the conditions of physical environment, taken as a whole, reflect themselves among other things, in the historical and political activity of man.' But he rightly adds, that considerations of physico-geographical character alone do not explain the variable element of human personality and initiative though they certainly underly the stage on which the drama of human history unfolds itself and consequently helps us to understand better the general trend of the historical processes. Interesting discussions are found in relation to such as geographical influences and rational topics, independence, lack of rational unity born of geographical isolation, the rôle of the camel in the economy of the people of Arabia, the Quran and the articles of dress and luxury and the problem of food in relation to the means available. In addition, an appropriate reference is made to the scientific of the Arab geographer's work on provincial and regional geography which in many ways anticipate some of the modern concepts of human geography.

One would like the author to expand many discussions on such portions as the hydro-geographical of settlements, the natural delineation of the country and the influences of environment and mobility. The fact that 'Arabia lies in the tropical latitude of low pressure' (p. 23) has nothing to do with its extreme dryness. The real cause of its rainlessness is the prevalence of the trade winds which blow from land to sea. The author has taken an exaggerated view of the adverse nature of the climate of the peninsula (Chapter IX). The additions of a few maps, showing the main lines of relief, prominent WADIS and the distribution of settlements would have been of immense use to the reader.

It is rather strange that Amin Ar-Raihani's marvellous book, 'MULUK-UL-ARAB' (Bairût, 1929), escaped the notice of the author.

All in all the author has made a useful contribution to the historical and human geography of Arabia. A select bibliography, subject index and a list of Arabic words used, have been provided at the end. The book is one of general usefulness both for students of Islamic history and culture and human geography.

AKHTER IMAM.

ANCIENT RACES AND MYTHS. By CHANDRA CHAKRABERTY.
V. K. Bros., 81 Vivekananda Road, Calcutta. 132 pp.

It is not always pleasant to review a book even if it is immensely so to read it. The booklet under review is a unique production. It gives proof of wide reading and condensed thought but the author seldom finds it necessary to discuss the statements which are put forward categorically and with conviction. Archaeological findings are important in the identification of races but they are not unerring guides to the reconstruction of human racial chronology, as the author seems to think. Mr. Chakraberty thinks that 'the bones do not tell lies' therefore archaeological findings are important, but bones do not speak, we speak on bones, there lies the trouble.

'The Austrie race is characterized by chocolate brown colour of the skin.' 'In religion they have no higher conception than totems and taboos.' 'The Wegroids evolved in Western Africa.' 'The Caspians are the tallest (above 7 ft. high)', 'the Jats and Kushans are Caspians' according to the author, 'they practised jar burials at Harappa' 'pot burials.' 'The Alpines have the highest brain capacity (1,450 c.c.)' though the average cranial capacity of the Eskimos is 1,560 c.c. and Amerindians 1,450 c.c.' 'The Aryans were a blend of the Caspians, Mediterraneans as major factors, Austroloids and Negroids as very minor elements.' 'The Negroes (Rakshasas) and Negrittoes (Nishadas) coming from the north-west crossed the peninsula and passed through the Assam corridor', Mongoloids 'fused with the Negrittoes, formed the Santals and Mundas'. 'The Austries had a certain mixture of Negroid blood which imparted to their hair wavy characteristics.' If all these are mere myths, they have been well put. If they are claimed to be 'rational' I doubt if anybody would be convinced. Many of his conclusions which he thinks are proved are so hypothetical that it is no use discussing them. I would end this review by quoting him from his own introduction to the booklet, 'Within the same totem group sexual union is tabooed, consequently marriage is exogamous and due to psychic fixation, there is a strong incest phobia among them, which by psychological inhibitory reaction proves that sexual intercourse had been rather promiscuous among them and not only endogamous, but even it did not exclude close blood relations'. This is what the author writes about the Aruntas of Australia.

D. N. M.

MODERN PERSIAN POETRY. By M. ISHAQUE, B.Sc., M.A., Ph.D. (London), Lecturer, Calcutta University; with a Foreword by the HON'BLE NAWAB MAHDI YAR JUNG BAHADUR OF HYDERABAD. Pp. xix+226. Calcutta, 1943.

Dr. M. Ishaque has already earned a reputation as the author of an anthology of modern Iranian poetry, entitled *Sukhanvarān-i-Īrān dar 'Aṣr-i-Hāzīr*, which he published in two volumes in 1933 and 1937. The present work is, as stated by the author, 'a general survey with a critical estimate of the position of modern Persian poetry'; 'it may justly be regarded', says the author, 'as a critical supplement to the anthology containing the data on which this dissertation is mainly based'. The book is divided into seven Chapters. It opens with an account of the birth of modern poetry in Iran—in which the author has referred to the political and social causes which brought about a change in the outlook of the people and which found an echo in the songs or the laments of the poets. In the next Chapter, we get a list of eighty-three modern poets, with brief notices of their lives and comments on their style. Among them are included two ladies, Parvīn-i I'tiṣāmī (died 1941) who wrote under the pen-name of *Parvīn*, and the princess Faṣl-i Bahār Khānum, who has adopted the *nom de plume* of *Jannat*. In the third Chapter the author has discussed the changes in the language of modern Persian poetry and has referred to two movements which have brought about this change (p. 35). According to him, 'the first is a Purist movement, the sole aim of which is to eliminate Arabic elements traditionally connected with the former classical and theological learning. Paradoxically enough, the second movement runs counter to the first in that it readily borrows words from Western languages in order to make good the deficiency caused by the ban on Arabic terms . . . ' (p. 45). He refers to a third movement also, which, according to him, is to bring 'the poetical language nearer to the spoken idiom.' Dr. Ishaque has dealt with these movements in some detail. In the Chapter on Metres, the author has traced briefly the history of the development of the Persian metre and has referred to the isolated attempts of certain poets to depart 'from the traditional metrical principles' and 'to compose verses according to the syllabic system'; but no systematic effort has, it seems, been made to strike a new line. . . . In verse-forms (Chapter V), also, Modern Persian poetry has not made any change of remarkable importance. No doubt, 'Ishqi, Afsar, and Ayati have made certain innovations, while certain inferior poets have tried to introduce the European system of rhyme or European verse forms into Persian, but their attempts have not found favour with the more distinguished poets of modern Iran.

Dr. M. Ishaque's discussion of the 'Themes' of modern Persian poetry is the longest and also, perhaps, the best. The themes, 'if studied according to their chronological growth and development', fall within three distinct periods: (1) 1890-1896, (2) 1896-1924, (3) 1924 to the present day. The history of the development of political consciousness among the Iranians, as reflected in their poetry, makes interesting reading. Poets have played no mean part in the awakening of modern Iran. The contact with Russia and the improvement of Russo-Iranian relations following the signing of the Soviet-Persian Treaty in 1921, urged a number of poets to propagate socialistic ideas through their poems, but their efforts were nipped in the bud by the stern Riza Shah Pahlavi. A feature of modern Persian poetry is the tolerant appreciation by Muslim poets of Zoroaster, the ancient Prophet of Iran; another marked feature is 'the new attitude towards women which constitutes one of the most important changes in modern Iranian life'. In the concluding chapter, the author has summed up the mission of modern Persian poetry; he has referred to its achievements and has invited pointed attention to its shortcomings. 'The modern period,' he says, 'with all its redeeming features and drawbacks, is a period of Romanticism in the poetry of Iran. Like the Romantic movement in English literature, it is essentially a product of the freedom of thought.'

The book ends with a useful bibliography and a carefully prepared index.

Dr. M. Ishaque is a notable authority on the subject which he has chosen for his study; he has taste and judgment and his book will be read with interest and profit by all students of Persian poetry.

M. M. HAQ.



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Further additions to the list of Ciliates living in the Intestine of *Rana cyanophlyctis* from Nova-Goa.

By ALFREDO FROILANO BACHMANN DE MELLO.

(Communicated by Col. I. Froilano de Mello.)

Bhatia and Gulati¹ record the following parasites in *Rana cyanophlyctis*: *Opalina caracoidea* Bezz., *O. ranarum* (Val. & Purk), *Balantidium ovale* Dobell, *B. gracile* Bezz., and *Nyctotherus macropharyngeus* Bezz.

Froilano de Mello² gives the following list: *Nyctotherus macropharyngeus* Bezz., *Opalina lata* Bezz. var. *cordata* de Mello, *O. ranarum* (Val. & Purk.), *O. coracoidea* Bezz., and *Balantidium helenae* Bezz.

For the present study we have sacrificed some *R. cyanophlyctis* collected in the monsoon pools near the Bacteriological Institute of Nova-Goa. The smears have been fixed by Schaudinn's sublimate or Bouin and stained by Mayer's Haemalum or by Heidenhain's iron haematoxylin.

The Ciliates found are:

(1) *Nyctotherus macropharyngeus* Bezz.—Typical specimens. The measurements taken in 50 individuals have given the following numbers:—

No. of individuals.	Length.	Width.
1	325	200 microns
1	320	180
1	310	180
2	300	210, 190
5	290	200, 2/180, 2/185
1	285	140
3	280	180, 160, 175
5	275	145, 150, 165, 175, 180
3	270	150, 2/190
2	260	115, 160
3	250	160, 130, 140
4	240	160, 3/140
1	230	125
3	225	150, 2/130
2	220	2/130
1	215	120
1	210	125
3	200	150, 130, 125
2	190	2/130
1	170	150
1	165	125

N.B.—A curious specimen showing some anomalies in the structure will constitute the object of a further special note.

(2) *Nyctotherus cordiformis* Stein.—Typical specimens. The measurements taken in 50 individuals have given the following numbers:—

No. of individuals.	Length.	Width.
3	125	70, 2/75
3	120	50, 60, 70
4	115	60, 3/75
4	110	75, 2/60, 55
3	105	50, 2/60
8	100	2/65, 2/75, 4/100
3	95	70, 60, 65
11	90	30, 40, 55, 5/60, 2/70, 75
1	85	65
11	80	3/50, 4/55, 4/60
1	70	50

N.B.—In many of these specimens the peristome is somewhat longer and more bent than normally. As, however, both kinds of peristome are seen in these *Nyctotherus*, without any other differences, we believe that they constitute only an individual variation and cannot be considered as a character of variety.

(3) *Balantidium helenae* Bezz.—Typical specimens. The measurements taken in 30 individuals have given the following numbers:—

No. of individuals.	Length.	Width.
1	120	50
2	115	2/55
1	105	50
2	100	55, 50
2	95	45, 50
4	90	50, 3/55
3	85	30, 40, 50
8	80	2/45, 2/40, 3/50, 65
3	75	40, 50, 55
4	60	40, 3/45

N.B.—The location of the nucleus varies extremely: among the 30 individuals studied 16 were found with the nucleus more or less central or subcentral and 14 with the nucleus situated in the posterior third, often quite near the ectosarc.

(4) *Balantidium gracile* Bezz.—Typical specimens. The measurements taken in 52 individuals have given the following numbers:—

No. of individuals.	Length.	Width.
2	250	65, 70
1	230	45
2	220	30, 35
7	210	30, 2/45, 2/50, 55, 60
8	200	25, 35, 2/40, 45, 2/50, 55
5	180	2/30, 3/40
16	160	23, 2/25, 7/35, 2/45, 3/53, 75
5	155	2/25, 2/30, 40
3	145	40, 2/45
1	130	25
1	105	40
1	100	45

(5) *Opalina lata* Bezz.—Typical specimens. The measurements taken in 25 individuals have given the following numbers:—

No. of individuals.	Length.	Width.
2	340	270, 220
1	330	250
1	325	240
4	320	230, 280, 180, 265
3	315	180, 260, 225
3	300	260, 2/220
2	295	215, 200
2	290	225, 180
3	280	180, 2/225
2	275	200, 220
1	260	215

(6) *Opalina ranarum* (Val. & Purk.)—Typical specimens. The measurements taken in 29 individuals have given the following numbers:—

No. of individuals.	Length.	Width.
2	280	2/130
1	275	160
3	270	140, 2/150
2	260	2/120
1	255	120
7	250	125, 110, 3/140, 2/100
4	240	120, 105, 2/110
1	230	100
5	225	110, 2/125, 2/105
1	220	100
1	215	110
1	205	125

(7) *Opalina coracoidea* Bezz.—Typical specimens. The measurements taken in all the 13 individuals found in our smears have given the following numbers:—

No. of individuals.	Length.	Width.
1	380	225
1	350	200
1	330	230
1	325	185
1	310	160
1	305	240
1	290	190
2	280	170, 220
1	275	195
2	260	205, 175
1	240	210

N.B.—There were found in these three big *Opalina* (*O. lata*, *O. ranarum* and *O. coracoidea*) several individuals possessing deeper stained longitudinal zones which led Froilano de Mello² to describe the var. *cordata* in *O. lata*. We are doubtful whether such a columnar structure should constitute a variety or if it belongs to the normal constitution of these three *Opalina*, where the deeply stained zones are due to a condensation of the endoplasm in the medullary region taking for this reason a deeper stain. We prefer therefore, on this ground, to include the *cordata* varieties under the main species.

(8) *Opalina virgula* Dobell. *O. virgula* has been described by Dobbell in *Racophorus maculatus* from Ceylon³. It has been also found by Froilano de Mello in *Racophorus maculatus* from Nova-Goa⁴ and recorded by the same author in the intestine of *Bufo melanostictus* from Nova-Goa². The measurements given by these authors are:—

Dobell: 170 or over $\times 50$ microns.

Froilano de Mello: In *R. maculatus*: 75 to 280, most between 125 to 180; diameter of nuclei 4.5 to 5.5.

In *Bufo melasnoctictus*: 40 to 380, most between 100–200 \times 25 to 70 microns and sometimes 100–125 microns.

It is therefore for the first time that *O. virgula* Dobell is recorded as a parasite of *Rana cyanophlyctis*. The measurements taken in 22 individuals have given the following numbers:—

No. of individuals.	Length.	Width.
2	125	55, 70
3	100	40, 45, 50
1	95	35
1	90	40
2	85	40, 45
6	80	30, 35, 40, 2/45, 55
5	75	25, 50, 55, 2/40
1	70	30
1	60	45

(9) *A Cepedea* belonging to the group *Dimidiata*.—The study of this species is founded on 48 specimens whose measurements are:—

No. of individuals.	Length	Width.
2	160	2/25
4	150	2/30, 40, 25
2	145	2/30
4	140	25, 30, 35, 40
3	135	2/25, 30
5	130	20, 25, 30, 2/35
6	125	23, 4/25, 30
8	120	3/20, 3/30, 2/25
3	115	20, 25, 30
4	110	4/25
3	105	3/20
2	100	20, 25
1	90	25
1	85	25

In short: length: min. 85, max. 160, 55% of the individuals having the length between 120–140. Width min. 20, max. 40. The commonest width is of 25 microns. The ratio of length to width is approximately 5 : 1.

This *Cepedea* belongs therefore to the group *Dimidiata*. The number of nuclei varies between 13–20, their diameter

being 4-5 microns. There are, however, some elliptical nuclei 5×4 .

All these nuclei are composed of a more or less compact mass of chromatin surrounded by a thin membrane, between which and the endosome there is a clear area resembling a halo.

The animal is more or less lanceolate with the anterior pole rounded and the posterior pointed. This fusiform appearance is constant, the pointed tip being more or less pronounced. The animal in fixed preparations shows some variations, being either elegantly bent or sometimes irregularly sinuous.

Concerning the structure, two distinct zones are to be seen: the cortical one, some 3 microns broad, appears sometimes completely clear, but in well stained preparations it can be seen that it is alveolated, with big irregular alveoles very faintly stained in contrast with the closely-packed, strongly-stained alveolation of the medullary zone, which on the posterior tip ends in a triangle with the vertex directed to this pointed pole. The whole ectosarc is constituted by longitudinal parallel striae, 1,5 to 2 microns being the distance between two adjacent striae. The ectosarc is also bounded by cilia 7 to 7,5 microns long.

This *Opalina* differs from the species *Cepedea seychellensis* Metcalf var. *angusta* de Mello, 1932, parasite of *Rana tigrina*, as the posterior tip of this last species is more blunt and the diameter of the nuclei only 3,2 microns. Its length is min. 50, max. 135, 88% being between 75-110². The same species in *Bufo melanostictus* has the following measurements: length min. 50, max. 218, 89% between 86-175. Diameter of the nuclei: 3-3,5².

Table summarizing the comparative characters.

Species.	Form.	Length.			Diam. of nuclei.	Width.			Ratio L/W.
		Max.	Min.	Aver.		Max.	Min.	Aver.	
<i>Seychellensis</i> var. <i>angusta</i> . (<i>R. tigrina</i>)	Slightly fusiform with post. tip blunt.	135	50	75-110	3,2	40	12	20-25	4/1
<i>Idem</i> (<i>Bufo melanostictus</i>)	Idem	218	50	86-175	3-3,5	50	14	25-40	4/1
<i>Sp. under study</i>	Lanceolate post. tip pointed.	160	85	120-140	4-5	40	20	25	5/1

The species we are describing now belongs undoubtedly to the group *Dimidiata* Metcalf. It cannot be similar to *C. lanceolata* Bezz, parasite of *Rana esculenta chinensis* as this species possesses a limited number of nuclei, whereas in our case they are abundant.

It differs from *C. fuljensis* Metcalf, parasite of *Bufo formosus* which possesses very big nuclei of 7,7 microns; it differs also from *C. mexicana* Metc. whose nuclei are distinctly ellipsoidal, in many cases being twice as long as broad.

We must now compare our species with the narrow forms of *C. dimidiata* for which Metcalf gives the following measurements:—

Species.	Length.	Width.	Diameter of nuclei.	Ratio L/W.
<i>C. dimidiata</i> ..	180	25	4-4,5	7/1
<i>C. dimidiata orientalis</i> ..	180	45	3,7-4	4/1
<i>C. dimidiata paraguensis</i> ..	138	45	3-4,4	3/1

For all these reasons we consider our species as a variety of *C. dimidiata* which we will name *C. dimidiata* var. *cottoniana* in homage to Bishop Cotton Boys' High School, where the author spent some happy years as a boarder.

Conclusion.—To the list of the Ciliates hitherto recorded in *Rana cyanophlyctis* Schneider, we will add:—

- (1) *Nyctotherus cordiformis* Stein.
- (2) *Opalina virgula* Dobell.
- (3) *Opalina* (*Cepedea*) *dimidiata* var. *cottoniana* var. nov.

Therefore the revised list of the Ciliates of *Rana cyanophlyctis* is (considering that the var. *cordata* of the big *Opalinas* is only a structural appearance which may even occur in *Zelleriella* as we can see in the species *Z. foliacea* Carini, 1938, par. of *Leptodactylus ocellatus* from Brazil ⁵):

- (1) *Nyctotherus macropharyngeus* Bazz. (Bhatia & Gulati, Froilano de Mello and the present writer).
- (2) *N. cordiformis* Stein (the present writer).
- (3) *Balantidium ovale* (?) (Bh. & Gul.).
- (4) *B. gracile* Bezz. (Bezzenberger ⁶, the present writer).
- (5) *B. helenae* Bezz., (Bezz. Fr. de Mello, the present writer).
- (6) *Opalina coracoidea* Bezz. (Bh. & Gul., Fr. de Mello, the present writer).
- (7) *O. ranarum* Val. & Purk. (Bh. & Gul., de Mello, the present writer).

(8) *O. lata* Bezz. (*Fr. de Mello*—the so-called *var. cordata*, the present writer).

(9) *O. virgula* Dobell (the present writer).

(10) *O. dimidiata* *var. cottoniana* n. *var.* (the present writer).

BIBLIOGRAPHY.

¹ Bhatia, B. L. and Gulati, A. N. *On some parasitic Ciliates from Indian frogs, toads, earthworms and cockroaches* in Arch. fur Protist, LVII, 1927.

² Froilano de Mello. *Contribution à l'étude des Infusoires parasites des Anoures du Malabar* in Rec. of the Ind. Museum, XXXIV, 1931.

³ Dobell C. C. *On some parasitic Protozoa from Ceylon* in Spolia Zeylanica, Vol. VII, Part XXVI, 1910.

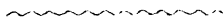
⁴ Froilano de Mello. *Infusoiresdu parasites Racophorus maculatus Gray* in Arq. Esc. Med. Cirurg. de Nova-Goa, Serie A, Fasc. VI, 1930; also in Atti dell' XI Congr. Internat. di Zoologia, Padova, 1931.

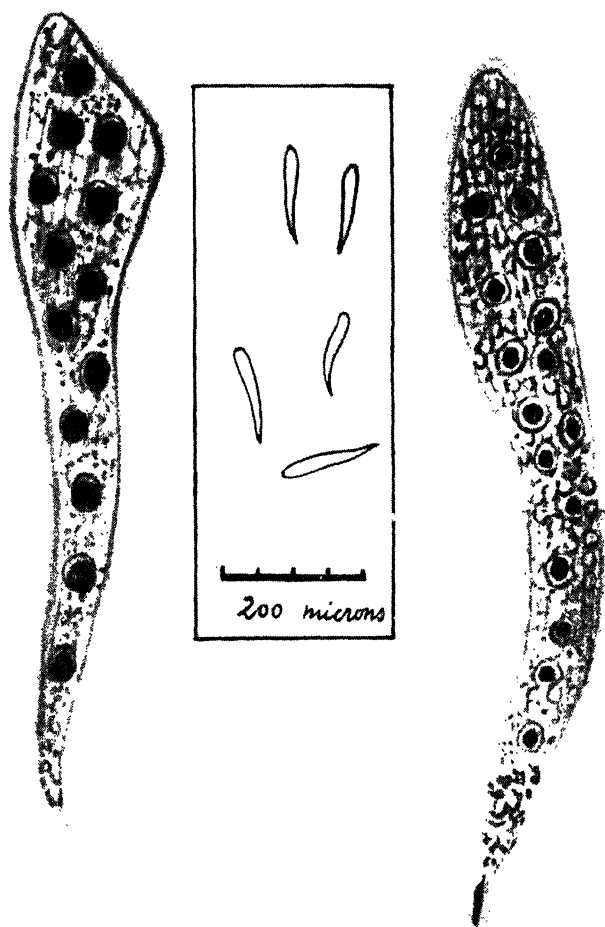
⁵ Carini, A. *Contribuciao ao conhecimento das Opalinidae dos Batraquios do Brazil* in Boletim Biologico (Nova Serie), Vol. III, 1938.

⁶ Bezzenberger, E. *Ueber Infusorien aus asiatischen Anuren* in Arch. fur Protist, Vol. III, 1904.

Paper received—17-8-1943.

Paper published—10-7-1944.





Cepedea dimidiata var. *cottoniana* n. var.

**Description of Day's specimen of *Dentex nufar* (Val.)
from Sind.¹**

By K. S. MISRA.

(Communicated by Dr. S. L. Hora.)

Though Day published an illustration of *Dentex nufar* (Val.) in the Atlas (pl. xxxiv, fig. 4) accompanying his 'Fishes of India', no account of the species or even a reference to it was included in the text. Recently while working on the systematic position of a species of *Petrus* from Baghdad,² a special search was made to trace Day's specimen of *D. nufar*, for it is well known that the majority of the specimens illustrated by Day were purchased from him for the collection of the Indian Museum, Calcutta. It is of special significance, therefore, to report that Day's specimen (Register No. 2160; Sind; purchased from Day) has been found and in order to facilitate reference in future a description of it is given below. It may be noted that the species is now included in the genus *Cheimerius* Smith and not in *Dentex* Cuvier.

***Cheimerius nufar* (Valenciennes).**

1830. *Dentex nufar*, Valenciennes, *Hist. Nat. Poiss.*, VI, p. 240.

1876. *Dentex nufar*, Day, *Fish. India*, pl. xxxiv, fig. 4.

1938. *Cheimerius nufar*, Smith, *Trans. Roy. Soc. S. Africa*, XXVI, pp. 292-295.

D. XII/10; A. 3/8; P. 1/16; V. 1/5; C. 17; L. 1. 65; L.tr. 8/16.

In Day's specimen of *Cheimerius nufar* from Sind, the body is compressed and oval in section. The dorsal profile is greatly arched, especially from the tip of the snout to the base of the dorsal fin while the ventral profile is only slightly arched. The snout is smooth, oblique and moderately pointed; its length is contained 2.8 times in the length of the head. The length of the head is contained 3.6 times in the total length and 3.0 times in the length without the caudal. The depth of the body is greater than the length of the head; it is contained 3.3 times in the total length and 2.7 times in the length without the caudal. The eye is situated nearer the tip of the

¹ Published with permission of the Director, Zoological Survey of India.

² Hora, S. L. and Misra, K. S.—*Journ. Roy. As. Soc. Bengal, Science*, IX, p. 12 (1943).

snout than to the posterior border of the operculum; its diameter is contained 3.6 times in the length of the head, 1.2 times in the length of the snout and 0.87 times in the interorbital width. The two nostrils of each side are situated close together in front of the eye; the posterior nostril is oval and larger while the anterior nostril is rounded. The mouth is of moderate extent with the jaws subequal. The maxilla extends to opposite the middle of the eye. There are 4 strong canines in the middle of the upper jaw and 6 in the lower jaw, of which the inner pair is very small while the others are as strong as those of the upper jaw. The remaining teeth form a villiform band in each jaw, those of the outer series are larger and pointed while those of the inner are somewhat obtuse. The gill-rakers are lanceolate, half as long as the gill-filaments and 14 in number. The preopercle is slightly serrated at the angle.

The dorsal fin commences some distance behind the base of the pectoral fin; its first spine is contained 3.3 times in the diameter of the eye and the second 1.8 times. The 3rd, 4th and 5th spines are filamentous, while the tips of the other spines also project beyond the membrane. The longest spine is the 3rd and is about $\frac{7}{8}$ of the depth of body. The anal fin is inserted below the 12th dorsal spine; its first spine is considerably shorter than the other two which are subequal and are as long as the diameter of the eye. The pelvic fin is pointed owing to its first ray being greatly produced.

There are 9 rows of scales on the cheek. The preopercle is mostly naked except its inner lower margin which possesses 4 rows of scales. The interorbital region is partly scaly; the scales extending as far as the front margin of the eye.

The coloration of the preserved specimen is uniformly reddish brown.

Measurements in millimetres.

Total length	..	..	..	..	..	295.0
Standard length	..	..	..	..	..	245.0
Length of head	..	..	..	..	..	80.0
Diameter of eye	..	..	..	..	..	21.8
Length of snout	..	..	..	..	..	28.0
Interorbital width	..	..	..	..	..	19.0
Depth of body	..	..	..	..	..	87.0
Length of 1st spine	..	..	..	..	..	6.5
Length of 2nd spine	..	..	..	..	..	12.0
Length of 3rd spine	..	..	..	..	..	76.1
Length of 4th spine	..	..	..	..	..	60.3
Length of 5th spine	..	..	..	..	..	49.8
Length of 6th spine	..	..	..	..	..	39.0
Length of 7th spine	..	..	..	..	..	30.0
Length of 8th spine	..	..	..	..	..	28.0
Length of 9th spine	..	..	..	..	..	25.5
Length of 10th spine	..	..	..	..	..	24.5
Length of 11th spine	..	..	..	..	..	24.0
Length of 12th spine	..	..	..	..	..	22.0
Length of 1st ray of soft dorsal fin	..	..	..	..	..	22.5

Length of 1st anal spine	..	..	..	..	10.0
Length of 2nd anal spine	..	..	..	..	21.5
Length of 3rd anal spine	..	..	..	..	21.5
Length of the longest ray of pectoral fin	..	..	..	..	68.0
Length of the pelvic fin	..	..	..	..	40.0
Length of the longest gill-filament	..	..	..	..	15.0
Length of the longest gill-raker	..	..	..	..	7.5

Paper received—11-11-1943.

Paper published—11-7-1944.

Two Indian Rafts.

By K. P. CHATTOPADHYAY.

I.

THE ŚOLĀ RAFT OF NORTH BENGAL.

In this note a description is given of a little known raft made of bundles of *śolā* (*Aeschynomene aspera*), used in the marsh lands and wide shallow pools of Northern Bengal. As the photograph (photo 1) shows, the raft is made of two horn-shaped bundles of reeds (*śolā*) tied together by ropes of fibre (palm stem and jute fibre usually). The horns are about eight to nine feet long (specimen—8' 6"), and have a diameter of three to four feet (specimen—3' 6") at the base. Where they join, after six to seven feet, near the tip, the diameter is within two feet. The joined single horn turns at a slightly obtuse (nearly right) angle to the rest of the body, and is about two feet long. It forms the prow of the raft.

The two bundles are kept in position, by four transverse bamboo (half) pieces reaching the outside of the horns through them, and by the seat of trapezoid form. Two of the bamboo pieces—the lowest and the highest are visible. In the specimen, in the museum of the Anthropology Department of the University of Calcutta, the distance between the centre of the bundles at the base is three feet nine inches. The first transverse bamboo piece is at a distance of nine inches from the base and has a length of two feet five inches between the bundles (excluding the portion inside them). The next three pieces are at distances two feet six inches, three feet eight inches and four feet eight inches respectively from the base. The lengths between the bundles are one foot four inches, eleven inches and six inches respectively. The seat is made of split bamboo. There is a frame below tied firmly to the two bundles of reeds. On these are fitted the transverse pieces constituting the seat proper. The seat begins at a distance of one foot nine inches in the specimen, and is two feet wide. The near side (near to base) of the trapezoid (of the seat) is three feet, and the opposite side two feet, in length. The total weight is twenty-six pounds approximately. It can be carried by one man. The raft is propelled either by a paddle, or by hand, using the hands in lieu of a paddle.

II.

THE GOURD RAFT.

The Gourd raft (photo 2), so far as I am aware, has not been described before. It was observed to be used on the river Jumna (Jamuna) about twenty miles from Dehra Dun.

The raft consists of two rectangular frames, each made of short lengths of bamboo. The longer pieces are about five feet and the shorter pieces three to four feet in length. The two frames are loosely tied parallel to each other, and covered over with a rope net with wide meshes, of diameter six to nine inches. Inside this bag is packed a large number of bitter gourds, carefully dried in the sun, so that the shells are unbroken and the inside is hollow. The rafts are easy to carry, being quite light and the user paddles across rivers, using his hands, while seated on the structure of nets, gourds and bamboo.

Paper received—9-6-1943.

Paper published—11-7-1944.



PHOTO 1.—Reed (Solā) Raft of North Bengal.



PHOTO 2.—Gourd Raft of the upper reaches of the Jumna river.

Note on the Corypha Palms of Bengal.

By A. P.[†] BENTHALL.

(Communicated by Dr. K. P. Biswas.)

Everyone who has lived in a rural part of India knows the common 'toddy palm', as it is usually called by English-speaking people in Bengal, or 'tal gachh' as it is called in Bengali, which is such a typical feature of the countryside in most parts of the plains. Its large fan-shaped leaves of a soft bluish-green, and its stout, straight, lofty trunk are almost too well known to need any description. This palm is a dioecious plant, that is to say it has flowers of the two sexes separated on different trees, with the result that fruits are only found on the female trees, for which reason some of the vernaculars have different names for male and female plants. The English name 'toddy palm' is, by the way, very confusing and misleading, because the greater part of the toddy collected from palms in the province comes not from this tree, but from the wild date palm (*Phoenix sylvestris* Roxb.), and moreover toddy in other countries is obtained from many other kinds of palm. A better name for this well-known and very useful tree is the 'palmyra', which is its common English name in most of the places in which it is found. Its botanical name is *Borassus flabellifer* Linn.

This note, however, is not about palmyras, which have only been mentioned here because they are not unlike some curious relatives of theirs that are now to be described, and they make a useful starting-point from which to begin the description.

In a few gardens and parks of Calcutta, and perhaps in other parts of Bengal as well, there may be found some palms with stouter trunks than those of the palmyras, and much larger fan-shaped leaves borne on longer stalks. Unlike the palmyra (which every hot season bears its male or female flowers, as the case may be, in small dense clusters at the base of its leaf-stalks, and, if the tree is female, every year produces a crop of large spherical fruits approaching a coconut in size), these rarer palms grow for many years without producing a single flower, and only at the end of their life, which normally seems to be thirty to forty years, suddenly burst forth in a mass of bloom borne in a huge branching panicle at the summit of the trunk above the centre of the leaves. This monstrous inflorescence may attain a height of 25 or 30 feet above the top of the trunk, or

nearly half the height of the whole tree, and probably constitutes an easy record for a single mass of bloom on a branch intended solely to bear flowers. The leaves also probably exceed all other leaves in one respect, namely their breadth; for those of adult trees, though not nearly as long as those of some other palms, vary from 8 to 16 feet in width.

These trees belong to the genus *corypha*, which includes in all about six species of palms, all believed to be natives of tropical Asia. Three of these are found in Bengal, though it is probable that none now occur in the province except where planted or protected by man. The genus was first described by Linnaeus. The name is from the Greek 'koruphe', meaning a head, or summit, presumably in allusion to the strange character of the inflorescence.

All the species of the genus have stout trunks more or less marked by horizontal rings, and immense fan-shaped leaves, borne on long spinous stalks, and divided about half way from the margin of the fan to the middle of the leaf into numerous narrow segments. The top of the trunk is often clothed for some distance below its summit with the brown stumps of old leaves that have died and broken off just above the base. Some time after the tree has reached maturity the leaves gradually begin to decrease in size and in the length of their stalks, until the flowering stage of the tree is reached. When the plant begins to flower the remaining leaves droop wearily downwards as if not to interfere with the grand spectacle of the huge inflorescence above them; and as the innumerable fruits ripen, the last leaves die and finally fall to the ground leaving the trunk standing bare and leafless, crowned by the many naked branches of the fruiting panicle.

The small greenish or yellowish flowers closely resemble those of most other palms, each having three minute sepals, three larger petals, six stamens surrounding a short style, and an ovary consisting of three carpels. The flowers are densely clustered on the numerous branches of the panicle, and are at first included in many spathes, or sheaths, which cover the young parts of the inflorescence. It is said that when the largest, or 'primary' spathes, which include the whole panicle when it is in bud (if such a monstrous growth can be called a bud), first open under pressure from the expanding branches within, they burst with a loud report, which can be heard at a great distance. This happens in the early part of the hot season.

The fruits vary in size according to their species from that of a marble to that of a golf ball. They are formed by the development of one carpel only and bear at the base the remains

of the two abortive carpels. They are roughly spherical in shape, and fleshy in texture, each usually containing a single large seed within a layer of soft pulp. Normally the fruits do not ripen and fall to the ground till nearly a year after the flowers have opened.

It is no easy task to separate and identify, either in the field or in the herbarium, the three species of corypha that are now to be found in Bengal, and the matter has been made more complicated by certain mistakes and discrepancies that have found their way into some of the standard works on Indian plants. But with the kind help of Dr. K. Biswas, the Superintendent of the Royal Botanic Gardens, and of Mr. Mitra, the Curator, the writer has been able to overcome these difficulties. Field observations in the neighbourhood of Calcutta, and an examination of the specimens available in the Calcutta Herbarium, confirm that the three species are distinct, and the following key should make it quite easy to identify them:—

- A. Trunk stout without any conspicuous spiral groove or marking; leaf-stalks not much, if at all, longer than the blade of the leaf, more than 2 inches wide at the narrowest part; fruits more than 1 inch in diameter (as large as a crab apple).
- B. Trunk ultimately 50 feet high or more; leaf-stalks green, spines less than $\frac{1}{2}$ inch long; leaf-blades roughly semi-circular in outline (ignoring the narrow segments); primary branches of the inflorescence coming from fissures in the backs of their respective spathes.

Corypha umbraculifera.

- B. Trunk not exceeding 35 feet in height; leaf-stalks somewhat brownish or yellowish, spines more than $\frac{1}{2}$ inch long; leaf-blades (ignoring the narrow segments) almost circular in outline; primary branches of the inflorescence coming from the mouths of their respective spathes.

Corypha Taliera.

- A. Trunk 40 to 60 feet high, rather slender, marked with a conspicuous spiral furrow or marking which gives the trunk a twisted appearance; leaf-stalks much longer than the blades of the leaf, more than 2 inches wide at the narrowest part; fruits not exceeding 1 inch in diameter, (about the size of a cherry).

Corypha elata.

The following is a detailed account of the three species:—



FIG. 1.

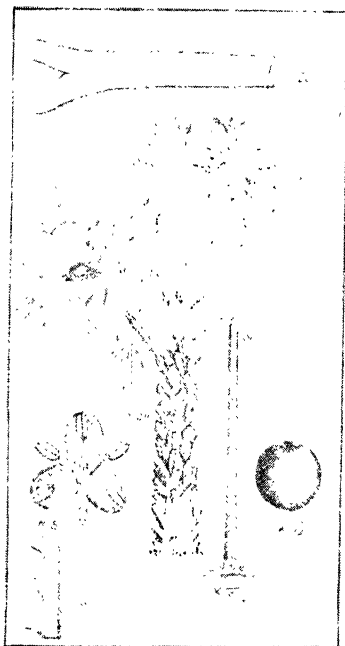


FIG. 2.

CORYPHA UMBRACULIFERA Linn.

(Umbraclifera is Latin meaning 'shaped like an open umbrella' in allusion to the leaves.)

Sanskrit .. Tali, Sritalam.

Bengali .. Tali, Tara, Tarit, Tallier, Bajar Battuler.

Kanarese .. Tali, Shritali.

English .. Talipot Palm (of Ceylon), Fan Palm (of South India).

The vernacular names have been much confused with those of other species of the genus, and also with those of *Borassus flabellifer* Linn., the palmyra.

Trunk stout and straight, attaining 80 feet in height and $2\frac{1}{2}$ feet in thickness in more favourable climates, but in Bengal usually not more than 60 feet by $1\frac{1}{2}$ feet; marked with numerous horizontal rings but without any conspicuous spiral marking. Leaf-stalks green, stout, in adult trees more than 2 inches wide at the narrowest part, about the same length as the blade of the leaf or shorter; armed on the upper margins with many small spines or teeth less than $\frac{1}{2}$ inch long. Leaf-blades roughly semi-circular in outline, 6 to 12 feet wide (in an adult tree), divided half way to the middle of the leaf into 80 to 100 segments, which are about $4\frac{1}{2}$ inches wide at the base and taper gradually

towards their points. Inflorescence with many spathes, pyramidal, 10 to 20 feet high, on a short stout stalk the primary branches of which pass through fissures in the backs of their respective spathes. Flowers small, greenish-white, clustered in rather slender curved spikes; calyx scarcely $1/25$ inch long; petals about $1/12$ inch long, elliptically oblong; the stamens have subulate, ovate filaments which are curved upward and obtuse anthers; ovary somewhat suddenly narrowed into a rather slender style which in full grown buds attains the level of the apices of the anthers; stigma punctiform. Fruit almost globular, about $1\frac{1}{4}$ inches diameter, rather rough, greyish-green, one-seeded.

* * * * *

This tree may be easily distinguished, when mature, from its near relatives by its stout green leaf-stalks armed with small spines less than $\frac{1}{2}$ inch long, and by its tall trunk with little or no trace of any spiral marking. The semi-circular shape of the leaves is also distinctive, but this is not easy to see in the case of a tall tree, though it is a useful means of distinguishing a young plant.

The talipot palm is much cultivated in many parts of South India and Ceylon, and is believed to be indigenous in North Kanara, where it is very abundant. It is the most handsome of the three coryphas found in India, and is often planted in large gardens and parks, sometimes in double rows to form avenues. In Bengal it seems to have been more common formerly than it now is, but today it is certainly rare in the province, and may perhaps no longer exist outside the Royal Botanic Garden and the Eden Gardens, where fortunately a number of specimens may still be found. Until recently a few others grew in various parts of Calcutta, but the last one known to the writer, a young tree about twelve years old growing near the Alipore Police Station, was cut down in 1942. It is much to be hoped that others will be planted where space can be found for them in large gardens.

In places where the talipot palm is common it has very considerable economic importance. The leaves are made into fans, mats, umbrellas, and portable tents, and strips from them are used for writing on as a substitute for paper. An old author quoted by Sir George Watt in his Dictionary of the Economic Products of India writes as follows: 'The leaf, being dried, is very strong and limber, and most wonderfully made for man's convenience to carry along with him, for though the leaf be thus broad (to cover 15 or 20 men), when 'tis open it will fold close like a lady's fan, and then it is no bigger than a man's arm; it is wonderfully light.' The strips used for writing purposes are called 'olas' and are made by first removing the ribs or nerves of the leaf, and then boiling the

remaining strips in water, after which they are dried and polished by friction against a wooden plank. From the pith of the trunk a kind of edible sago is obtained, from which a food like bread is made. The seeds closely resemble ivory in texture and a large trade is, or used to be, carried on from the West of India and Ceylon, mostly by Arabs. They are used for making buttons, small carved ornaments, and beads, and they are sometimes coloured for sale as pieces of coral. Their name in the trade is 'bazarbatu nuts' or 'bayurbatum nuts'. It is said that apart from a tendency to become discoloured with age, these seeds are in every way as good as ivory for making small carved articles. In the west of India the seeds are also said to be used for stupefying fish, for which purpose they are pounded and thrown into ponds or tanks so that the half-poisoned fish may come to the surface and be caught.

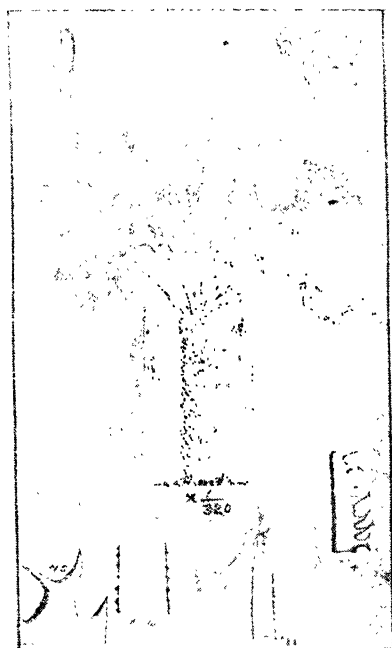


FIG. 3.

CORYPHA TALIERA *Roch.*

(Taliera is a latinized form of a Bengali name.)

Sanskrit .. Tali.

Bengali .. Tara, Tallier, Tarit.

Trunk very stout and straight, attaining 30 feet in height and 2 feet or more in thickness, marked with numerous impres-

sions of fallen leaves but without any conspicuous spiral marking. Leaf-stalks brownish or yellowish, stout, in adult trees more than 2 inches wide at the narrowest point, about the same length as the blade of the leaf, armed on the upper margins with black spines more than $\frac{1}{2}$ inch long. Leaf-blades almost circular in outline (owing to the edges almost meeting near the stalk), 8 to 12 feet wide, or even wider, divided less than half way from the margin to the centre of the leaf into 80 tapering segments which are about 4 inches wide at their base. Inflorescence a diffuse oval panicle, 20 feet high or more, making the total height of the tree about 50 feet. Primary branches of the inflorescence ascending through the mouths of the broad spathes. Flowers small, whitish, clustered in numerous curved spikes, odorous; calyx minute; petals 3, oblong, concave, fleshy, many times longer than the calyx; anthers oblong-elliptical, obtuse or emarginate; ovary turbinate, almost truncate at apex and not gradually narrowed into the style; style as long as the ovary and subulate; stigma sessile. Fruit almost globular, wrinkled and dark greenish-yellow when ripe, sometimes joined to one or two other fruits, which are often rudimentary. Seed solitary, spherical, white and horny.

* * * * *

This palm, although not nearly as stately as the other two species, is certainly the most extremely specialized of the three, and is undoubtedly one of the most remarkable plants to be found in the whole world. It may easily be distinguished when mature from the talipot palm by the brownish colour of its leaf-stalks and by the large black spines with which they are beset, and when young by the nearly circular outline of its leaves. From *Corypha elata* it may be known by the great thickness of its trunk, the size of its leaves, and the stoutness of its leaf-stalks. In the flowering stage it may be recognized at once by the shortness of its trunk (only about 30 feet), and by the great relative size of the inflorescence, which approaches the height of the trunk itself.

All writers agree in saying that Bengal is the original habitat of this tree, but no record seems to exist of it having been found wild anywhere. At the beginning of the 19th century it appears to have been not uncommon under cultivation in Bengal, and the leaves were known to be used as writing material in the same way as those of the talipot palm are used to this day in the south of India. The existence of Bengali names for the plant confirms that it was once by no means rare in the province. Even within living memory several specimens were to be found in various Calcutta gardens; but it seems that in recent years exotic palms, having more graceful outlines and occupying less space, have supplanted this Bengali tree in its own country,

with the result that in the year 1943 the writer was not able to trace a single specimen outside the Royal Botanic Garden; and there the species is represented by only a single mature tree and perhaps a few seedlings. It is sad to think that an unlucky storm or an incident of war might deprive Bengal of what is perhaps the only tree strictly peculiar to the province, and the world of one of its grandest and most curious plants. It is much to be hoped that when the sole survivor in the garden bears fruit, an effort will be made to increase the numbers of this nearly extinct palm.

In his earlier work, 'Bengal Plants', published in 1903, Sir David Prain reduces *C. Taliera* to a form of *C. umbraculifera*, but he restores the species *C. Taliera* in his later work, 'The Vegetation of the Districts of Hughly, Howrah, and the 24-Pergunnahs', which was published in 1905.

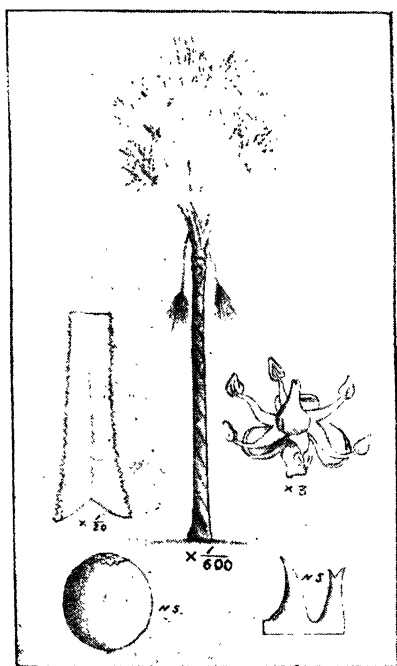


FIG. 4.

CORYPHA ELATA Roxb.

(Elata is Latin meaning 'tall'.)

Bengali .. Bajur, Bajurbatul.

Trunk straight, 60 to 70 feet by about $1\frac{1}{2}$ to 2 feet thick, marked with rings, and with a conspicuous spiral furrow caused

by the spiral arrangement of the leaves, which gives the whole trunk the appearance of being twisted. Leaf-stalks slender, less than 2 inches wide at the narrowest part, much longer than the blade of the leaf, mostly ascending except when the tree is about to flower, armed with numerous black curved spines on the upper margins. Leaf-blades more or less circular in outline, about 8 feet wide, divided about half way from the margin to the centre of the leaf into 80 to 100 segments, which taper little and end in a blunt point divided into two lobes. Inflorescence compact, about 15 to 20 feet high, with innumerable smooth, pale yellow ramifications. Flowers small, pale yellow, in dense clusters; calyx three-toothed; petals 3, oblong, reflexed; anthers ovate-cordate, obtusely apiculate; ovary subglobose, faintly 3-lobed, conical in its upper part and (somewhat suddenly) narrowed into a slender style which attains the level of the anthers in the unexpanded flower; stigmas 3, distinctly punctiform. Fruit globular, the size of a large marble, olive-coloured, smooth when fresh but soon becoming dry and wrinkled, one-seeded.

* * * * *

This palm, though very handsome when a young plant, becomes rather untidy as it matures owing to the leaves getting damaged by the wind, and is perhaps the least desirable of the genus as a garden plant. It may be known from the other species by its slender leaf-stalks, and by the very noticeable spiral marking of its trunk, which may be clearly seen even when the trunk is covered with the dead bases of old leaves. When the tree reaches the flowering stage, the comparatively small inflorescence (which is not more than a fourth the height of the whole tree), and the small fruits, are also distinctive.

This palm is indigenous in the Philippines, the Malay Islands, the Cocos Islands, Burma, and probably the Andamans. It has been suggested that its wide distribution is due to the activities of fruit-eating bats (flying foxes), which are very fond of its fruits and undoubtedly help to disperse the seeds. It is supposed to be a native of Bengal, though as in the case of *C. Taliera*, there seems to be no record of its ever having been found growing wild in the province. The palms now considered to be referable to this species that are found in the Philippines, Malaya, and Burma, were considered by early authorities to belong to other species, but their reduction to *C. elata* is now accepted. The identity of the coryphas found in the Andamans is of special interest. Early authors referred these palms to *C. umbraculifera*, and Kurz, who was familiar with both *C. umbraculifera* and *C. elata*, referred the palms found in the South Andamans to a new species, *C. macropoda* Kurz. Beccari and Martelli,

in their monograph on Asiatic palms (Annals of the Royal Botanic Garden, Calcutta, Vol. XIII), on page 24 state that *C. macropoda* Kurz should be reduced to *C. umbraculifera* Linn., and on page 29 say that *C. macropoda* Kurz is specifically distinct from *C. elata* Roxb. But on page 14 and page 16 they definitely hold that the true *C. umbraculifera* does not occur in the Andamans, and that the corypha occurring in these islands is *C. elata* Roxb. This opinion must be accepted as probably correct, but it seems to have been founded more on the known wide distribution of *C. elata* Roxb. rather than on any definite records or evidence. It appears that Beccari and Martelli did not themselves visit the Andamans, and in view of the difficulty in identifying these palms from herbarium specimens, it is possible that further field observations will show species of corypha other than *C. elata* Roxb. to be indigenous in those islands.

In former times this fine palm seems to have been much more commonly grown in Bengal than it is at present, though apparently it has never been cultivated in other parts of India. The existence of a Bengali name shows that it was once well known to the people of the province, and it is recorded that it was once used for most of the purposes to which the talipot palm is put to this day in places where it is plentiful. The writer has seen two specimens flower and die in or near Calcutta in recent years, but there are now few survivors to succeed them. In fact he knows of none outside the Royal Botanic Garden, except some young plants in the shrubbery at the east end of the Zoo. It is to be hoped that others are still to be found elsewhere in the province, for although this tree is less striking and handsome than its relatives, and although it cannot be claimed as a tree entirely peculiar to Bengal, it would be a great pity to allow such a remarkable and useful plant to become more rare than it now is.

This note will have served its purpose if it succeeds in reviving a little interest in these three strange palms, which have been so neglected in Bengal, probably because of the rival attractions of the many kinds of exotic palms now to be found in almost every garden in the province.

If any reader knows of a specimen of *C. Taliera* anywhere outside the Royal Botanic Garden, or of *C. elata* apparently growing in a wild state in any part of the province, the writer would be very grateful for the news.

SUMMARY.

This note attempts to point out the principal differences between three Indian species of the genus *Corypha* Linn., and to facilitate their identification in the field.

A brief account of the genus is given, together with a description of the three species found in India, and a mention of their economic uses.

All three species are cultivated in Bengal. One species is common in parts of southern India, but the other two are not found in any part of India except Bengal, and neither has ever been recorded in a wild state in India, though one is widely distributed in other parts of south-eastern Asia. All the species have become scarce in Bengal during the last hundred years, and one species, which has not been recorded outside Bengal, may perhaps be reduced at the present time to a single individual now growing in the Royal Botanic Garden at Sibpur.

Some doubt may still exist regarding the identification of the coryphas indigenous in the Andamans.

Literature consulted.

- Beccari, O., Asiatic Palms—Corypheae, Annals of the Royal Botanic Garden, Calcutta, Vol. XIII, 1931. Revised and edited by O. Martelli.
- Blatter, E., Palms of British India and Ceylon.
- Brandis, D., Indian Trees (1911).
- Burns, W., Firminger's Manual of Gardening for India (1930).
- Cooke, T., Flora of the Presidency of Bombay, Vol. II (1907).
- Hooker, J. D., Flora of British India, Vol. VI (1893).
- Kurz, S., Forest Flora of British Burma, Vol. II (1877).
- Macmillan, H. F., Handbook of Tropical Gardening and Planting (1935).
- Prain, D., Bengal Plants, Vol. II (1903).
- Prain, D., The Vegetation of the Districts of Hughly, Howrah, and the 24-Pergunnahs. Rec. Bot. Surv. Ind., III, pt. 2 (1905).
- Roxburgh, W., Flora Indica (Clarke's Edition), p. 298 (1874).
- Watt, G., Dictionary of the Economic Products of India, Vol. II, pt. ii (1885).
- Watt, G., The Commercial Products of India (1908).
- Woodrow, G. M., Gardening in the Tropics (1910).

EXPLANATION OF FIGURES.

- FIG. 1. Photo of *Corypha umbraculifera* in full bloom in the foreground against the background of a group of palms in the palmetum of the Royal Botanic Garden, Calcutta. Photo—Dr. K. Biswas.
- FIG. 2. Sketch of *C. umbraculifera*, a young plant and an old flowering one by its side showing flower, fruit, and spines.
- FIG. 3. *Corypha Taliera* showing a small tree, portion of the leaf and spines, flower bud, and an open flower.
- FIG. 4. *Corypha elata* showing a full-sized tree, flower, fruit, and spines.

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Anatomy of Jute Stem with special reference to Cambial Activity and Distribution of Fibres in relation to Leaf-Trace System.

By B. C. KUNDU.

(Communicated by Dr. S. P. Agharkar.)

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INTRODUCTION.

The detailed developmental anatomy of most of the Indian fibre plants has not been investigated up to now. Studies of structure in relation to development are very useful, as many features of fibre structure which have economic significance will probably receive much elucidation when examined from this standpoint. In a recent paper, Kundu (1942) has described the anatomy of Jute and Hemp mainly from the standpoint of structure, development and distribution of fibres. Kundu (1943) has also investigated the formation of network of fibres in Jute. The structure of the stems of Jute and of the fibres has also been broadly described by Wiesner (1921), Mathews (1924) and recently by Patel (1940, 1941) and others. The distribution of fibres in relation to leaf trace development has been discussed by Kundu (1942) in a general way. In the present paper is described in detail the anatomy of Jute stem with special

reference to the cambial activity and the distribution of the fibres in relation to the leaf trace system.

The genus *Corchorus* comprises a number of species of which two, *C. capsularis* and *C. olitorius* are particularly important. Both these plants supply an important and useful fibre—the jute of commerce. Of these *C. olitorius* is indigenous and *C. capsularis* is of Chinese origin (Prain, 1908).

Both *C. capsularis* and *C. olitorius* are annual herbs and are mainly cultivated in Bengal; but they have been acclimatized in other parts of India and Burma. The green leaves of *C. olitorius* are used as a kind of vegetable and the dried leaves have medicinal uses.

The general morphology of the plants has been described by Watt (1908), Chowdhury (1921), Mukherjee (1921) and others. Kundu (1942) has given a short account of the morphology of *C. olitorius*. The two species are very similar from all structural standpoints, but differ mainly in the structure of their ovaries and fruits. In *C. capsularis* the ovaries and capsules are more or less round while in *C. olitorius* they are elongated. In general anatomical features also there is not much difference between the two species; and so in the present paper the two species will not be dealt with separately. There are, however, some minor differences which will be described at their proper places.

MATERIAL AND METHODS.

For the present study the two species of Jute, *C. capsularis* L. and *C. olitorius* L. have been used. For microtome sections growing points have been fixed in Formalin-Acetic-Alcohol, proceeded in the usual way and stained in Safranin and Light Green and Safranin and Fast Green. Freehand sections of fresh and preserved materials have been cut and observed in glycerine preparations. Permanent preparations have also been made after staining the sections in Safranin and Light Green.

ANATOMY OF AN INTERNODE WHICH HAS FINISHED GROWTH IN EXTENSION.

Figure 1 shows the outline of the cross section of an internode of *C. capsularis* which has finished growth in extension. The xylem has already formed a complete ring. From the grouping of the protoxylem elements inside the xylem ring the leaf-trace system can be identified. Cambial activity has commenced very early and thus a complete ring of xylem can be found there. Outside the cambium the phloem region is

very distinct. The whole of the protophloem region has already been converted into groups of fibres, which can be distinguished

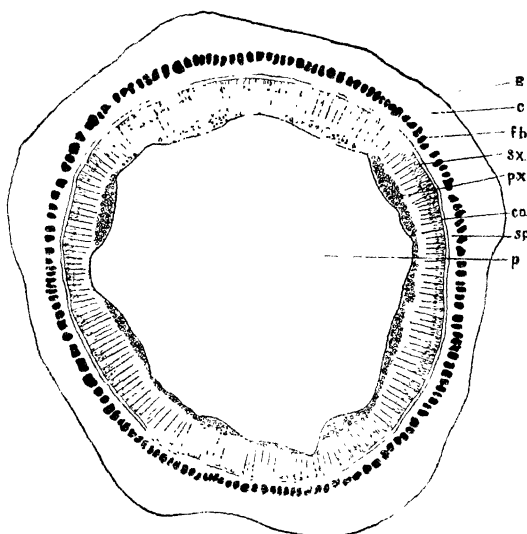


FIG. 1. Outline diagram of the transverse section of an internode of *C. capsularis* which has finished extension. Note that the secondary xylem forms a complete ring and a single row of fibre bundles has been differentiated ($\times 19$). E, epidermis; c, cortex; fb., fibre bundle; sp, secondary phloem; s.x., secondary xylem; ca, cambium; px, protoxylem; p, pith.

easily in the section. The secondary phloem is being formed just outside the cambium.

Figure 2 shows the details of the tissues of a portion of such an internode in transverse section under high power. The epidermis consists of a single row of cells, the outer walls of which have already become cuticularized to a great extent. This cuticle is freed from the outer walls as a thick band when treated with sulphuric acid. It does not dissolve in 70% solution of the acid. It remains intact even in concentrated sulphuric acid. The inner walls of the epidermal cells are also much thickened. Just inside the epidermis there is a single layer (at some places two layers) of cells with thin walls. Occasionally the wall of the cells may be thickened at certain places. These cells contain a large number of chloroplasts. Inside this layer there are about 4-8 layers of collenchyma cells. The collenchyma cells have their corners very much thickened, but these are much less conspicuous in dehydrated preparation. After the collenchyma cells there are about 4-7 rows of big parenchyma cells with conspicuous intercellular spaces. Among

these parenchyma cells of the cortex a number of mucilage canals of varying shapes are irregularly distributed. There

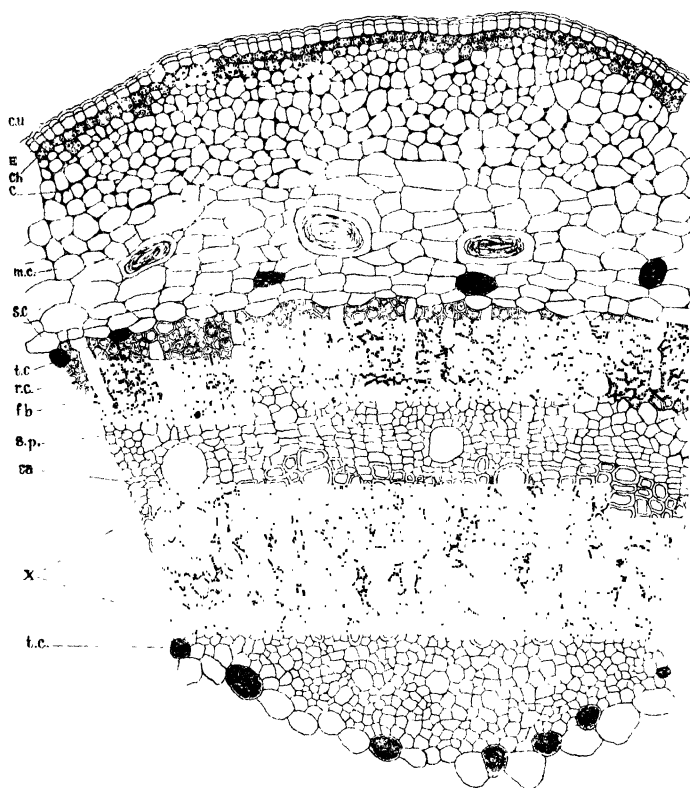


FIG. 2. Detailed drawing of a portion of the above section. Cu, cuticle; E, epidermis; Ch, layer of cells containing chloroplasts; c, collenchyma; mc, mucilage canal; t.c., tannin-containing cells; r.c., ray cells; s.c., starch containing cells; fb, fibre bundles; s.p., secondary phloem; ca, cambium; x, xylem. ($\times 150$.)

are 2-3 rows of cells containing starch grains; as these cells are arranged alternately it is difficult to distinguish one amongst them as strictly forming the starch-sheath. These cells are barrel-shaped and in the transverse view show intercellular spaces among them, but if the innermost layer is a true starch sheath such spaces will be absent between the transverse and radial walls of these cells. Within this starch sheath the fibre cells are arranged in groups in the protophloem region. The fibre groups are separated by one or more rows of parenchyma cells (medullary rays). In each group there are 15-30 fibre cells, the group extending over a radial depth of 6-9 cells. The

cells are polygonal being sharply angular and most of the cells of the fibre group have protoplasmic contents. Secondary phloem has been developed by the activity of the cambium and can be seen just inside the fibre-cells. The whole of the proto-phloem region has been occupied by the fibre-groups and towards their inside they are connected with the secondary phloem and are not separated by parenchyma cells. The secondary phloem is composed of sieve tubes, companion cells and phloem parenchyma. The cambium region includes 4-6 layers of cells. The xylem found at this stage is mainly protoxylem. Secondary xylem tissue has also been formed to a considerable extent by the activity of the cambium and it is beginning to lignify. Some of the earlier formed innermost vessels have been so extended in length as to be disorganized. Between the files of vessels groups of radially arranged parenchyma cells can be seen; they have been evidently formed by the secondary activity of the cambium. They are not completely lignified, but are in the process of lignification. Towards the pith in the xylem-ring a large amount of unlignified parenchyma cells can be observed. Between the vessels single rows of ray-cells run on to the cortex. The pith is composed of large parenchyma cells with intercellular spaces. Big mucilage canals conspicuous by their contents are distributed in the pith usually in one ring.

As growth proceeds xylem develops much more rapidly than the phloem and the secondary wood forms a complete cylinder. The protoxylem groups of the main traces are so arranged that the pith becomes somewhat pentangular and the phyllotaxis is suggested by the examination of the protoxylem groups.

In certain cases, particularly in *C. olitorius*, cambial activity is not uniform, radial growth being more vigorous on some parts of the circumference. In these regions only the vessels and the xylem elements immediately adjoining the vessels, have become lignified. In most stems of *C. olitorius* the cells in the centre of the pith are partially disorganized and are partly pulled apart by the increasing girth of the vascular ring to form a hollow cavity.

ANATOMY OF AN EXTENDING INTERNODE OF A VIGOROUSLY GROWING SHOOT.

Figure A, Plate I, shows the structure of an internode which is still growing in length. The region of the stem being younger, a great number of multicellular glandular hairs are found on the surface of the stem. The stem shows 5 distinct ridges which correspond to the five orthostichies. The epidermis and the cortical tissues are practically of the same type as found in an internode which has just finished extension. The most outstanding feature noticed in this internode is that fibre differen-

tiation has not completely taken place. The fibres are now developing from the protophloem region. Cambial activity has not commenced to a great extent and only little secondary phloem has been formed. The xylem is mainly protoxylem. On account of the very rapid growth in extension some of the first-formed protoxylem elements are seen to be crushed. The pith is composed of large parenchyma cells with intercellular spaces. A large number of mucilage cavities have developed in the pith and in the cortex. In some forms of *C. capsularis* tannin-containing cells are abundantly found towards the inner side of the vascular ring and are also irregularly distributed throughout the centre and the pith. Calcium oxalate crystals (sphae-raphides) are also found in great numbers.

ANATOMY OF AN INTERNODE FROM THE BASE OF THE STEM.

Figure B, Plate I, shows portion of a cross-section of an internode from the base of the stem. On account of rapid secondary growth a large amount of secondary xylem and secondary phloem has been developed. Secondary wood developed by the cambium has formed a thick zone and occupies the greater part of the radial depth of the section. The number of vessels with wide lumen in the secondary xylem is small compared with the number of smaller lignified elements, mainly fibres and wood parenchyma. Secondary phloem, although formed to a great extent, is comparatively much less in amount. It forms tapering wedges outside the secondary wood and separated by the very much stretched large parenchyma cells. These are definitely the primary medullary rays, as they are continuous from pith to cortex. There are certain other large parenchyma cells between the thinner wedges which are evidently the secondary medullary rays. They are also very much stretched tangentially and do not continue inwards through the whole radial depth of xylem (Kundu, 1943). Each wedge has a broad basal region and a more or less conical apical portion. Each conical wedge may consist of 2-4 thinner wedges separated by small-celled secondary medullary rays, which have evidently been formed by the activity of the cambium. In the secondary phloem alternating patches of soft tissues (sieve tubes, companion cells and phloem parenchyma) and fibres (metasclerenchyma, Kundu, 1942) can be seen. They are all arranged in radial rows, 2-4 of these radial rows forming the wedge-shaped masses. New secondary rays are formed within the wedge-shaped phloem masses and when these cells enlarge with the enlargement of the girth of the stem, the phloem masses may appear cleft into additional radial wedges. The first formed fibre groups which were originally closely arranged together separated only by one or two rows of small ray cells, now are seen to be set very much apart from each other by the tangential stretching of the primary

rays due to the enlargement of the girth of the stem, consequent upon vigorous secondary growth. In addition to the first formed group of fibres the figure shows 10-11 successive patches of secondary fibres. At the end of the growing season as many as 20 successive patches of secondary fibres may be observed in a vigorously growing stem of *C. capsularis*. In a flowering shoot, the region of the cambium at the base of the stem becomes very narrow as its activity has practically closed. The cells on both sides of the cambium become fully differentiated; even the groups of secondary fibres in the innermost row just outside the cambium give strong lignin reaction.

Although a large amount of secondary tissues have been developed a few of the leaf-trace bundles can be distinguished on account of the presence of abundant protoxylem elements in them, which are conspicuous even now.

Mucilage canals can no longer be distinguished in the cortex, but some of them can still be seen in the pith. In *C. olitorius* most of the cells of the pith have been pulled apart by the increase of girth of the vascular ring and a hollow cavity is formed there.

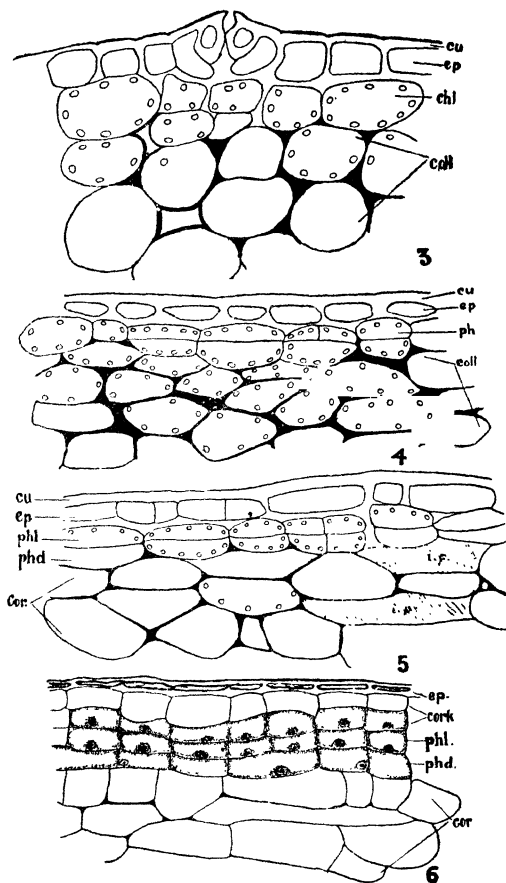
EXTRA-STELAR SECONDARY GROWTH.

Extra-stelar secondary growth in *Corchorus* is not very conspicuous. In *C. olitorius* there is no extra-stelar secondary growth in thickness of the stem. Even when the stem attains great thickness by the production of secondary xylem and secondary phloem tissues no formation of periderm takes place. The epidermal cells stretch tangentially to a great extent; they also divide radially and thus their number is increased. The collenchyma cells also stretch tangentially and lose most of their characteristic thickenings; they may also divide radially. Most of the parenchyma cells of the cortex are crushed by the radial growth of xylem and phloem.

Although there is no extra-stelar secondary growth and consequently no formation of periderm in the stem of *C. olitorius*, at certain places especially at the regions where there were stomata lenticels take their origin. The nature and formation of these lenticels is being investigated and will be published shortly.

Extra-stelar secondary growth, however, takes place in *C. capsularis*. This does not take place early in the growth of the stem. Even when 5 or more layers of fibres have been developed no secondary growth in the cortex is noticed (Fig. 3). As in *C. olitorius* the epidermal cells stretch tangentially and a number of them divide radially; the collenchyma cells likewise stretch tangentially and lose much of their characteristic thickenings.

In *C. capsularis* when 5 to 6 layers of fibre bundles have been formed, the chlorophyll-containing parenchyma cells



FIGS. 3-6. Stages in the extra-stelar secondary growth in the stem of *C. capsularis*. Fig. 3. Portion of a transverse section of an adult stem passing through the cortical region, showing a stoma. Note the subsidiary cells. Figs. 4-6. Stages in periderm formation. Fig. 6 shows the periderm; note the protoplasmic contents in the lower cork cells. ($\times 204$.) Cu, cuticle; ep, epidermis; chl, chlorophyll containing cells; ph, phellogen; phd, phelloderm; coll, collenchyma; cor, cortex; i.p., intercellular space.

which form a single layer just below the epidermis, begin to divide tangentially each forming at first two cells (Fig. 4). The cells of the upper layer act as the phellogen or cork-cambium. A cell of the developing phellogen layer may also divide radially. Rarely the lower cells divide radially (Fig. 5). The cork-

cambium develops 2-3 rows of cork cells on its outside, but does not usually develop cells on the inside (Fig. 6).

Phellogen formation begins to take place simultaneously in 3 to 4 successive internodes. The same stage in the division of the hypodermal cells can be observed in 3 to 4 successively lower internodes. Further, the formation of cork cells is not uniform throughout the different sides of an internode. It may be vigorous on one side and may be less vigorous on another side. The process of cork formation also takes place very slowly. Cells cut off from the cork cambium retain their nucleus and cytoplasm for a long time.

MUCILAGE CELLS AND CANALS.

The stem and leaves of *Corchorus* are characterized by the presence of mucilage cells and canals. The mucilage cells are not found in the axis of the growing point before the insertion of primordium 6, where they are seen for the first time. Sometimes before the insertion of primordium 6 they may appear in the pith. Each cell is surrounded by one or two rows of cells which are more or less secretory in nature. These cells soon lose their secretory appearance as the mucilage cells grow older. In most cases, however, the surrounding cells dissolve, and as a result wide mucilage canals are formed. In the stem long mucilage canals are found passing through the cortex and the pith. They are especially abundant in flowering shoots.

CRYSTALS OF CALCIUM OXALATE.

Crystals of calcium oxalate (sphae-raphides) are present in the different parts of shoots and roots. They are also abundant in the growing regions and the young internodes of a flowering shoot. They are usually deposited in the parenchyma cells of the cortex and the pith and also in the ray cells. Rarely they have been found in very young vessels of the secondary wood. They have a variety of forms.

TANNIN-CONTAINING CELLS.

In many forms of *C. capsularis* certain cells are found to contain a blackish content. The cells are parenchymatous; they may be oblong or oval or elongated in the tangential or in the longitudinal directions. The contents are of a peculiar nature and may occur in the cells in solution in the cell-sap or may form granules of various shapes and sizes (Fig. 7). The dark contents of the cells give the following reactions when treated with the reagents noted against their names:

- (i) They develop a deep blue-black colour when treated with Ferric chloride;

- (ii) they form a reddish brown precipitate with Copper acetate;
- (iii) they are also precipitated when treated with Potassium dichromate or Chromic acid and are coloured brownish; and
- (iv) they turn reddish brown with Potassium ferricyanide and Ammonia.

These contents are, therefore, described as tannin. In some cells some of the contents give the usual reactions for tannin,

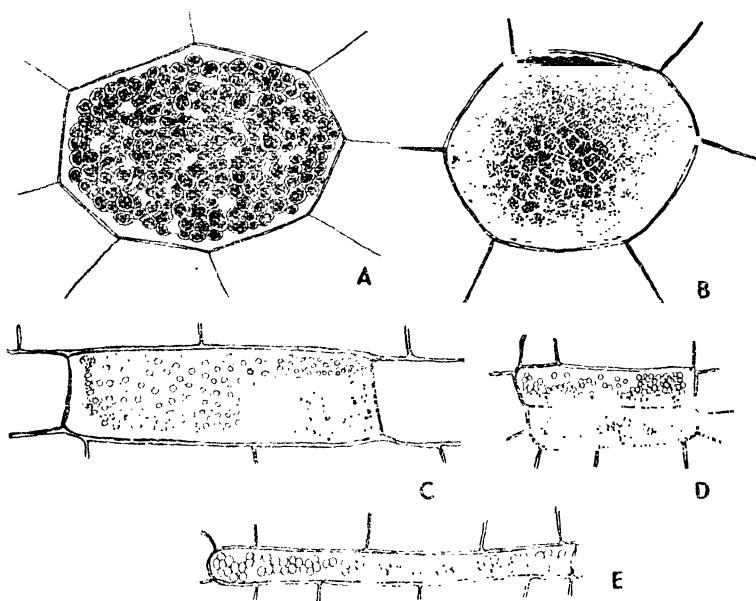


FIG. 7. Tannin-containing cells. A-B, cells in transverse view; C, a cell from a longitudinal section; D, E, the cells are elongated tangentially (from the secondary rays). ($\times 510$.)

while others may not react to the reagents. It may be that in certain cells tannin may be associated with other substances.

The tannin-containing cells are widely distributed in the different parts of the plant. They are found to be irregularly distributed in the pith and also along the periphery of the pith adjoining the vascular cylinder. They are also present in the phloem, in the ray cells and in the cortex. The distribution of tannin cells in a young internode can be seen in Fig. A, Plate I. The distribution of these cells in an adult internode from the base of the stem can be observed in Figs. B and C, Plate I.

PHYLLOTAXIS AND LEAF-TRACE SYSTEM.

The leaves are arranged in a spiral phyllotaxis which varies from $2/5$ to $3/8$ according to the vigour of the individual plants. The same plant may have $2/5$ phyllotaxy in the young condition and with increased vigour of the plant the phyllotaxy may change to $3/8$. If the phyllotaxy is $2/5$, the $2/5$ spiral is also indicated at the apex of the seedling or vigorously growing shoot, where 5 primordia are crowded together round the growing point as internodes have not developed between them. On the apical bud in the vigorously developing shoot with a $3/8$ phyllotaxy as many as 8 primordia are crowded at the apex without any appreciable internodes (Fig. 8).

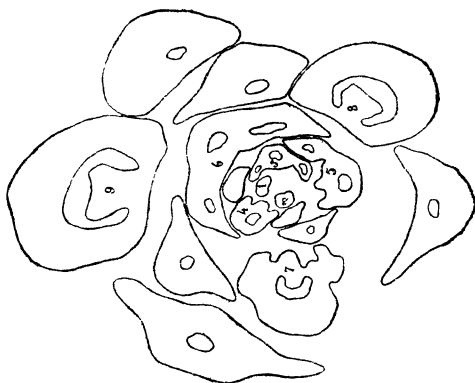


FIG. 8. Transverse section $20\ \mu$ above the stem apex of *C. capsularis* showing the arrangement of the leaf primordia. The primordia are arranged in $3/8$ th phyllotaxy. This section has been taken from a shoot apex where the phyllotaxy is changing from $2/5$ th to $3/8$ th. ($\times 30$.)

The phyllotaxis spiral may be right-handed or left-handed. The spiral is usually left-handed in *C. capsularis* and is right-handed in *C. olitorius*, but this condition may vary.

At the node a single leaf joins the stem. Each petiole has usually 3 bundles; the laterals may not be arranged at the same distance from the median. The 3 bundles enter the stem as a trilacunar trace. The cross-section of the stem shows 5 distinct ridges, which in the aggregate will be found to correspond approximately to the 5 orthostichies, the phyllotaxis being $2/5$. Each leaf at its insertion occupies more than half of the periphery of the stem involving the 3 ridges (Fig. 9).

A section of a young apex of a small plant with the first trace bundles differentiating shows the arrangement in Fig. 9. The 3 trace bundles of 1 and 2 and the median of 3 contain xylem. It is seen that the three main bundles appear in positions in accordance with a $2/5$ spiral. The leaves join the stem

in such a way that the anodic margin of 1 overlaps the cathodic margin of 2 (i.e. the next higher leaf) and the lateral bundles of the stem are found in corresponding positions.

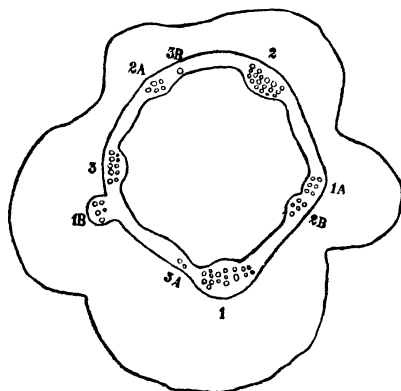


FIG. 9. Transverse section of the shoot apex of *C. olitorius* showing the trace bundles differentiating. ($\times 38$.)

At this region the following number of files of vessels can be distinguished in the different bundles.

			Number of files.	Radial number of vessels with thick walls.
Median bundles	{ 1	..	7	5
	{ 2	..	6	5
	{ 3	..	5	3
Laterals	{ 1A and 1B	..	3	2-3
	{ 2A and 2B	..	3	1-2
	{ 3A	..	2	..
	{ 3B	..	1	..

From a study of transverse sections of successive internodes below nodes it is found that the bundles of a trace travel through 5 internodes. As the bundles travel downwards, a gradual disappearance of the protoxylem is observed in them. At the sixth node the median trace bundle forks into two and runs along the two sides of the corresponding median bundle. The laterals do not usually fork, but deflects on one side. The forks of the median bundles as well as the deflections of the laterals join with adjacent bundles from higher leaves, become linked by common cambial activity and form synthetic bundles.

If the course of the bundles as described above were strictly followed in the axis it would give the theoretical longitudinal

course of the bundles shown in Fig. 10. In figure 11 is shown the actual arrangement of bundles in a young internode. In

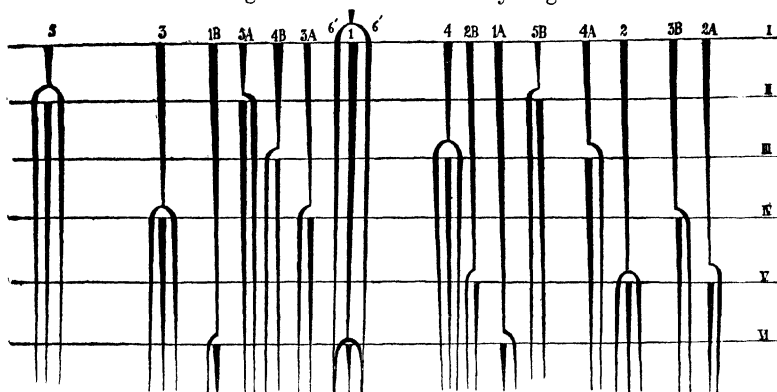


FIG. 10. Diagram showing the theoretical longitudinal course of the leaf-trace bundles in the stem axis of *C. capsularis*. The arrangement as shown in internode I in the diagram can be observed in Fig. 11. 2, 3, 4, 5, are the median traces of successively higher leaves; 1A, 1B, 2A, 2B, etc. are the laterals; 6', 6' are the forks of the median trace of leaf 6, which is in the same orthostichy with leaf 1. II, III, IV, V and VI are the successive lower internodes.

this figure the trace bundles of 1 and 2 and the median of 3 are seen in a position agreeing with that in the figure 10, but it is rather difficult to follow the rest of the bundles of a cycle with certainty. An attempt has been made to ascribe the various small protoxylem groups in the vascular ring to their respective strands in such a 2/5 system as constructed theoretically in figure 10. In figure 11 some of the bundles in the ring cannot be ascribed to their respective traces, as for example, between 3 and 5 and between 2 and 3B, also between 6' (a fork of 6) and 4, and 6A and 5B there are some differentiating protoxylem groups which cannot be correlated with any of the traces. They may be associated with higher leaves.

In a section of the internode (Figure 12) below the one from which figure 11 has been drawn the laterals of 3 and 4 and the bundles of 5 do not fall into the theoretical position according to the arrangement shown in figure 10. In still lower internodes difficulty is also felt in ascribing some of the trace bundles in their theoretical positions. Thus, actually the interpretation meets with difficulties; some of the strands of the laterals appear more appropriately identified if their places are changed. It may be assumed that the traces may have more or less oblique courses and, therefore, too much constancy probably must not be assumed for the exact vertical course of the bundles differentiating in such close proximity in the procambial ring and furthermore it must be remembered that there may be a tendency

in the plant for this $2/5$ system with increasing vigour of growth, to accommodate more than five primordia simultaneously at

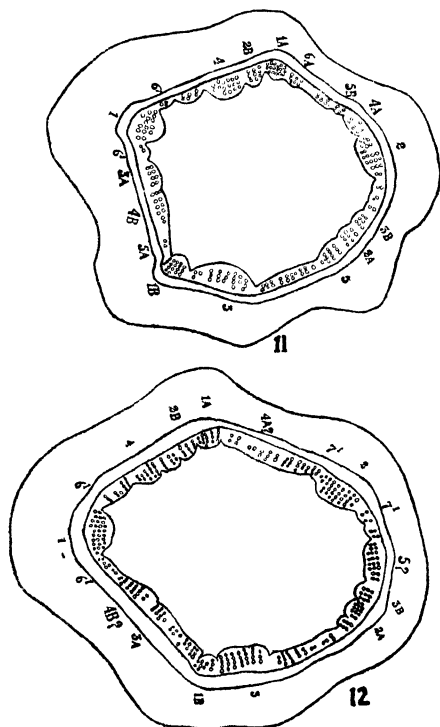


FIG. 11. Transverse section of a young internode of a small plant (about 9 inches in height). Most of the bundles are numbered and ascribed to their respective traces. See text. ($\times 19$.)

FIG. 12. Transverse section of an internode below the one from which Figure 11 has been drawn. For explanation see text. ($\times 19$.)

the apex and thus permit the lateral vascular strands to approach the arrangement which is appropriate to a $3/8$ system.

In this plant, however, the bundles do not remain distinct for long and soon coalesce into a woody ring in which the identification of individual bundles is of doubtful reliability. This is shown in figure 1, which is a diagram of the bundle arrangement in an older internode.

CAMBIAL ACTIVITY AND FIBRE DISTRIBUTION IN RELATION TO LEAF-TRACE.

In *Corchorus*, cambial activity begins very early; in this plant the prodesmogen tissue is in radial seriation and cambial

in origin from the very beginning (Kundu, 1942).. Therefore all the fibres including the first-formed or protophloem fibres arise from elements of secondary origin and are described as secondary (Priestley and Scott (1936), Kundu (1942)).

In a section of an adult internode the first formed (protophloem) fibres are arranged in patches all round the stem beneath the starch sheath. They do not form a continuous layer, but are interspersed with the ray parenchyma cells. These fibres, like those formed later, are also derived from radially seriated cells; where not too much displaced during differentiation, these are also arranged in a radial seriation.

When the cambium becomes active, some of the cells cut off to the outside become fibres, some differentiate into sieve tubes, companion cells and parenchyma of the secondary phloem. The presence of the fibres in the phloem prevents this tissue from undergoing tangential expansion as the tissues are subjected to strain during radial growth of the vascular cylinder. This strain is taken mainly by the living ray cells which extend tangentially and undergo radial divisions. The widening secondary rays thus separate the outwardly tapering-tongues of the fibre-containing phloem; eventually some of the fibre groups which are linked into a network in tangential longitudinal view will be split by the exposure of the vascular cylinder (Plate I, Fig. C) (Kundu, 1943.)

In sections of the internode passing gradually upwards towards the node it is found that the fibres opposite the incoming leaf-trace bundles become fewer and fewer. Just before the leaf insertion cambial activity on the vascular cylinder facing the median and lateral traces practically stops; and there are practically no fibres on the outside of the cambium facing the traces.

As leaf primordia develop on the shoot apex of a Dicotyledonous plant, vascular differentiation and associated cambial activity takes place in the vascular strands and in the downward continuations of these strands as the leaf-trace in the stem. So long as the leaf is growing the cambial activity arising in connection with such a leaf is propagated downwards indefinitely in the stem, it is responsible for continued activity in lower internodes which have ceased to grow in length. When the leaf is fully expanded, cambial activity associated with this leaf also comes to a standstill (Elliot, 1933) with the consequence that the xylem in the leaf and the upper part of the leaf trace is almost entirely protoxylem. This cessation of activity in the trace bundles is true so long as the bundle remains isolated in the stem by original rays on its flanks. (Priestley and Scott, 1936.) In *Corchorus*, however, the original rays are narrow and are traversed at an early stage by the spread of interfascicular cambial activity from the flanks of the bundles from younger leaves, which have forked or been diverted round the

leaf gap. This spread of cambial activity links up with the trace bundles and reactivates the vacuolated cambial tissues in the same way as the activity spreads across the rays as interfascicular cambium, but it is noticeable that the wood formed on the face of the trace bundles often tends for some time to be markedly parenchymatous and to show a scarcity of expanded vessels.

In *Corchorus* it has been seen that the fibres are formed in a number of successive zones in the new phloem which is formed with continued cambial activity. Considering this in relation to the way in which the cambial activity spreads across the face of the newly entered leaf trace soon after the bundles have reached their position in the stem vascular ring, it is clear that these successive zones of later formed fibres can only develop

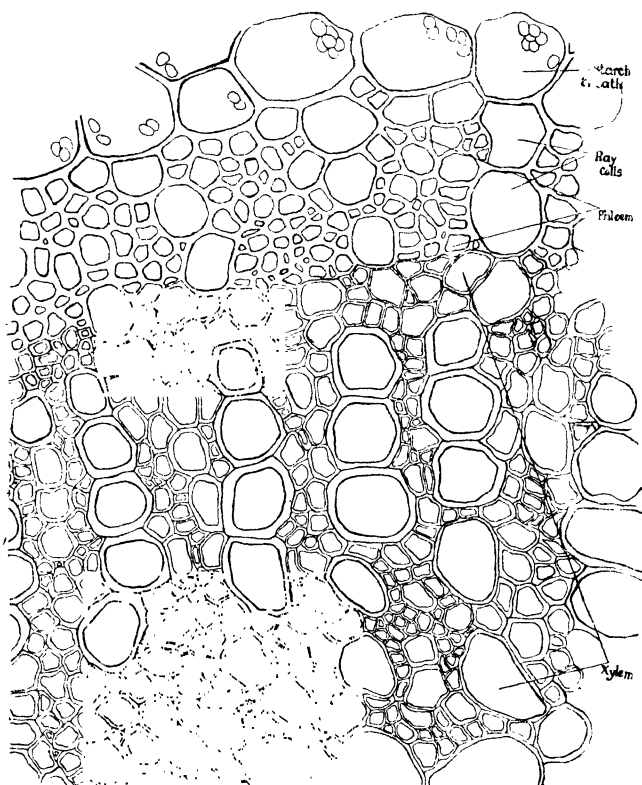
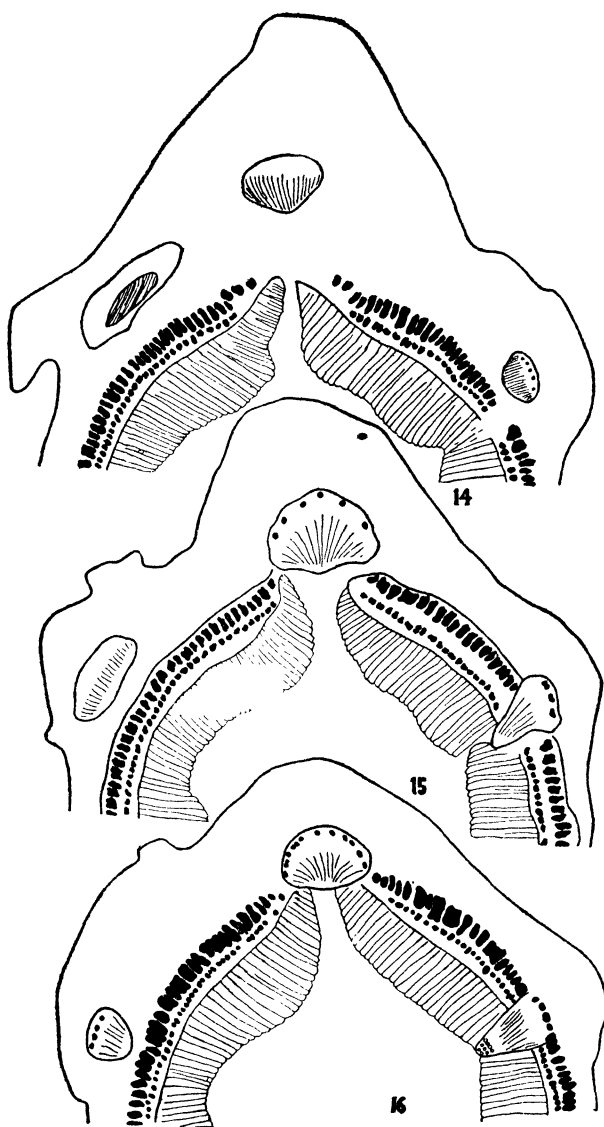


FIG. 13. Transverse section of a portion of the median bundle of the petiole. Note that fibres are absent in the phloem region. ($\times 345$.)

on the face of the trace where new phloem is being produced as the result of such activity. Where the trace bundles are passing



FIGS. 14-16. Transverse sections of an internode of *C. capsularis* below the node showing stages in the entry of the leaf traces. Note that the anodic lateral is joining the vascular ring earlier than the median and cathodic bundles. (The phyllotaxis spiral is left-handed.) Note that the cathodic lateral has not yet entered the vascular ring. ($\times 16$.)

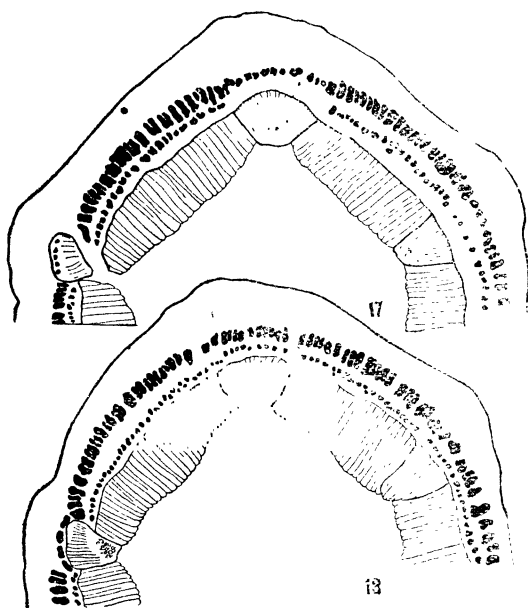
out into the leaf, they gradually emerge from beneath the covering of secondary tissues and beyond this point consist only of the xylem and phloem which were formed during the period of leaf expansion. Obviously the tissue from which the later formed bands of fibres develop is not present in this position and such fibres practically cease to differentiate from the trace.

The peripheral groups of fibres are, however, formed from the protophloem tissues and these are continuous along the bundles, both in the free limb and where they are continued in the stem as part of the leaf trace. In the leaf, however, the phloem is mostly of the nature of soft bast and contains the ordinary elements of the phloem (Fig. 13), but the continuations of the same bundles in the stem show the characteristic differentiation of peripheral fibres.

As the change is followed through leaf insertion it will be noticed that the peripheral fibres first appear when the trace bundles are near about the vascular cylinder of the stem (Figs. 14, 15, and 16); at first the fibres are the most peripheral and are only few in number but their number is rapidly increased by the formation of more centripetally placed fibres as the bundles pass further into the stem (Figs. 17 and 18). Thus if the course of the median and lateral bundles is followed as they enter the stem at the node, all these bundles will be seen to bring in with them, on the outer face of the phloem, typical parenchymatous elements identical with fibre cells in their general outline but without the characteristic thickened wall. In the stem such cells undergo differentiation into fibres and their number rapidly increases as the bundles from the leaf enter the stem. Thus in figure 14 there are no fibres on the face of the median trace, but in figure 15 (which is the fifth section from the last, each section being about $30\ \mu$ in thickness) 20 fibres have developed in the peripheral region of the trace. In fig. 16 where the median trace bundle has reached the xylem ring (11th section from figure 15) the number of fibres has increased to 103. In figure 17 (15th section from figure 16) the median trace has entered the vascular ring, but has not taken its position in the ring and it will be found that as many as 249 fibres have developed. This method of the increase in fibres continue centripetally.

The lateral trace bundles may not join the main ring at the same time with the median bundle, but they may be more rapid or slower in joining the ring. Usually the anodic lateral joins the ring first, then does the median and finally the cathodic lateral. As they traverse the phloem from the periphery to the vascular ring the same increase in number of fibres is seen. In one case (the anodic lateral in the figures) 11 sections, each some $30\ \mu$ in thickness, included the details of the passage of the lateral bundles of the trace across the phloem of the stem to a position in the xylem ring (Figs. 15 and 16), the number of fibres on the face of the bundle has increased from 23 to 70.

The number continues to increase further as the trace takes its position in the xylem ring at the periphery of the pith (Figs. 17 and 18). Again the first rapid increase is in fibres differen-



FIGS. 17-18. Entry of leaf-traces. Fig. 17. Note that the anodic lateral has properly taken its position in the ring and new fibres have appeared on its face within the peripheral fibres. Such fibres have not yet developed on the face of the median trace bundle. Fig. 18. Note that the median trace bundle has now taken its position in the vascular ring and so few fibres have developed on its face within the peripheral ones. Note that the cathodic lateral has not yet taken its position in the ring and so no fibres have as yet developed on its face. ($\times 16$.)

tiated from cells which would seem to be the natural continuation in the axis of the 'pericyclic' elements lying in the phloem both in petiole* and axis. 'It would appear that in the leaf the phloem elements, which are potential fibres, only differentiate into fibres where they are in close approximation to the fibre forming tissues in the stem and it may be that only those elements which are associated with stem fibres at their lower extremities undergo the differentiation; if this is so it is probable that the development of the most external cells into fibres farthest out into the leaf cushion will be related to their greater length, since being the earlier of the procambial cells to differentiate they will also be those most pulled out by extension.' (Kundu, 1942, p. 115.)

As the trace bundles take up their position in the vascular ring, fibres also develop on their face within the fibres at the periphery of the bundles (Fig. 18). These new fibres are 'evidently the result of a gradual lateral deflection, over the trace of elements cut off from the cambium of the vascular ring on the sides of the trace strands.' (Kundu, 1942.) Downwards in the stem when the bundles of the trace are completely embedded in the vascular ring, cambial activity completely encloses the trace strands and new fibres continue to be cut off in the usual manner.

DISCUSSION.

It will be clear that the preceding pages present some contribution to problems of fibre construction, from the standpoint of development. Some of these problems have been examined in connection with relevant observations of detail, but the more general problems, particularly of fibre differentiation and distribution will now be reviewed in the light of previous literature or of the present observations. The general problem relating to the distribution and structure of fibres have been reviewed in a general way in an earlier paper (Kundu, 1942). In the following pages the problem in relation to the distribution of fibres will be discussed in detail.

SCLERENCHYMA DIFFERENTIATION COMPLETED IN ADULT TISSUES.

The one general rule about fibre distribution appears to be that they are only fully differentiated in tissues in which all growth in length has ceased. In this respect they contrast very sharply with collenchyma which is always at its best development in growing tissues, in which full elongation has not yet occurred, and which often becomes much less conspicuous owing to the extent to which their characteristic thickenings on the wall tend to be smoothed out during the last stages of cell extension and expansion. It is interesting in this connection that the future sclerenchyma often passes through a collenchyma stage whilst this tissue is differentiating in a still•extending internode (Kundu, 1942), and this feature becomes much less evident as extension continues and is usually rendered completely inconspicuous during the earlier stages of secondary wall deposition, and is altogether absent in the thickened fibres.

Another consequence of this fact is that though the cells inside the outer phloem in many Dicotyledon veins and petioles, show early stages of differentiation which are entirely similar to those of the future sclerenchyma cells in the stem, characteristic thick-walled sclerenchyma has not been seen during this investigation and is not characteristic of Dicotyledon veins and petioles;

in the Dicotyledon the trace system practically ceases its growth with the final expansion of the leaf (Elliot, 1933), and its differentiation ceases soon after.

If growth and differentiation stopped in the neighbourhood of the vascular system in the stem to which the trace is joined, at the same stage, no characteristic sclerenchyma could ever be present in the stem; it is therefore not surprising to find that characteristic thick-walled sclerenchyma is usually absent in the Dicotyledon leaf and petiole. A very characteristic confirmation of this has been noticed in *Helianthus annuus*; here the strand of sclerenchyma shows most obvious connection with the leaf trace but if it is followed outwards at the node, the strand can readily be traced, though the characteristic thickening of the wall disappears immediately the strand turns outwards into the leaf with the trace bundle.

On the other hand, in Monocotyledon leaves whilst the upper part of the typical long blade is soon adult, the base shows continued growth over a long period of time, and growth and differentiation proceeds almost as long in the leaf as in the associated internode. Here quite characteristic thick-walled sclerenchyma develops as a normal thing in the leaf blade. Its structure and development has recently been studied by Meeuse (1938) in characteristic examples and my preliminary observations on the leaf of pineapple were in complete agreement.

DISTRIBUTION OF SCLERENCHYMA IN RELATION TO THE LEAF-TRACE SYSTEM.

The distribution of sclerenchyma in relation to the leaf-trace at first sight shows some contradictory features. The term *fibrovascular* shows how the distinct strand, so characteristic of the Dicotyledon shoot, which is always in its upward extension the strand of a trace, has been regarded by botanists as usually a strand containing both vascular and fibre elements and with practically no exceptions the fibre in the Dicotyledon follow a course in close proximity always to the phloem. On the other hand, in *Corchorus* now closely examined, no typical fibres are formed in the petiole and main veins, though outside the phloem elongated elements are present, which are continuous in the trace with the fibres and which follow at least the same general type of early stages of differentiation. Even in *Helianthus* where there is always a most prominent group of fibres associated with the trace immediately upon its insertion it is found that these elements are continuous in the petiole with elements of similar form but which are practically quite unthickened. (An exception to this has been observed in *Hibiscus esculentus* where somewhat lignified fibres can be found associated with the bundles of the petiole.)

This contradiction seems, however, explicable when the process of development in the trace in the Dicotyledon is considered. The characteristic feature of this development is that the growth and differentiation of the vascular strand (including presumably these elements in the pericyclic position of the future fibres) continues vigorously so long as the leaf expansion continues but that the cessation of surface growth of the leaf is followed practically immediately by a cessation of cambial activity in the vein and in the trace so long as it remains an isolated vascular system in the stem. Such elements as have recently been formed from the cambium complete their differentiation and then no more elements are formed.

The adult leaf system must continue to return supplies of food to the stem so long as its photosynthetic activities continue but these presumably can be carried through the phloem elements and we may assume that the cross-sectional area of the phloem remains adequate to its purpose, there is therefore no accumulation of excess photosynthetic products and no exceptional lateral leakage from the phloem, either in the vein or petiole or in the trace system in the stem so long as it remains an isolated trace system.

But if we consider the internode in which this trace system has just completed differentiation and which is now adult as it subtends an adult leaf, an entirely different condition of affairs will gradually be developing. Throughout the internodes, in addition to the more or less isolated trace of this leaf immediately above, are developing various other strands in connection with the leaf-trace system of leaves inserted at higher levels on the stem. In connection with these leaves vascular differentiation will continue until they in their turn become adult and again we may assume that the phloem produced is adequate to deal with the return flow of food from the leaves, at least until a full cycle of leaves (in the phyllotaxis sense) have become adult above this node. But the process still continues as leaves above this cycle (which comprises five or eight leaves in *Corchorus* on the main stem) become adult in their turn, and, though now in the synthetic bundles between the original leaf-traces, which connect with the leaves of still higher cycles, cambial activity continues and xylem differentiation in particular is vigorous, it would seem certain that secondary phloem production does not continue at a commensurate pace. The result will be that when these leaves of a higher cycle return food into the stem system, whilst the channels for its conduction remain adequate in the trace system as long as it remains independent, to an increasing extent as the flow continues downwards it will pass on to phloem strands with diminishing cross-sectional areas which must ultimately prove unable to deal with it. To an increasing extent, then, there must be lateral leakage and thus in the adult internodes, the

elongated cells around and amongst the phloem in front of the synthetic traces, are differentiating into thick-walled sclerenchyma and thus the lateral leakage of excess carbohydrates is immobilized. Thus in an adult internode the first signs of the thickened wall characteristic of fibres, appear outside the phloem everywhere except opposite the emerging leaf-trace, and they do not appear opposite the leaf-trace until the gradual spread of cambial activity from the synthetic bundles (Priestley & Scott, 1936) has brought the differentiation of secondary phloem once more over the face of this trace and linked it into the vascular ring. When this occurs, in plants such as *Helianthus*, where the trace has brought into the stem a group of elongated cells suitable to undergo this process of secondary wall deposition, a very characteristic group of fibres will be found facing the trace, but a study of adult internodes at various stages, will show that here also the fibre groups are later than those in face of the synthetic groups, in undergoing marked wall-thickening.

Another fact of fibre formation which fits very well with the considerations just advanced is the fact that in such a stem as *Corchorus* with $2/5$ phyllotaxis, the deposition of secondary layers in the fibres is a long continued process. Commencing in the first adult internode there is a rapid increase in the next few internodes and then it continues slowly but over a long period so that as observed here in *Corchorus capsularis* and by the writer (1942) in *Cannabis sativa* and *Corchorus olitorius* and by Tammes (1907) in *Linum* the process of wall deposition and thickening continues at the base of the plant as long as leaf growth continues and new adult leaves send supplies of photosynthates down the stem. The stem of the papaw (*Carica*) (the anatomy of which is now being worked out by the author) supplies evidence that enough fibre formation may be associated with cambial activity; the conditions governing wall-thickening and lignification of the bast fibres are very different to those governing the same process in the xylem. In a well-developed stem of the papaw a number of bands of thickened and lignified sclerenchyma fibres will be seen in stems in which, apart from the original strands, practically no lignified xylem elements have differentiated.

In all these plants the shoot dies down in winter, but in the woody perennial the continued formation of secondary fibre groups in the bast can evidently receive an explanation along similar lines. The annual radial increment of phloem bears nothing like the same proportion to the area of leaf canopy produced as does the annual increment of wood; it would be only natural if the downward movement of the products of assimilation failed to find adequate disposal in a longitudinal direction and accumulated laterally as fresh fibre groups. In many cases the fibres of earlier years may still retain living protoplasts and it is not excluded therefore that deposition will

continue in these outer fibres for several seasons. In fact the interesting observations of Krabbe (1887) are in direct support of such a conclusion.

In *Corchorus*, an annual plant, it is usual to assume that fibre development is a growth activity limited to a single growing season and that the adult fibre at the end of the growing season has no living contents left. Kundu (1942) has observed that in both *Cannabis* and *Corchorus* the fibres in the basal internodes are wider than any other fibres and the evidence is good that these fibres retain some protoplasm throughout the life of the plant and continue to deposit internal layers of cellulose and to increase in girth so long as the plant is vigorously growing. This point, however, deserves closer examination¹ in view of the earlier observations of Krabbe (1887) upon the fibres of *Nerium oleander*. These observations which seem to be passed over in most texts, showed that in these woody plants the fibres retain their protoplasmic contents for twelve years or longer and that the walls of the fibres began to undergo remarkable modification (local bulbous expansions with newly deposited inner secondary layers within them), but not until they were at least three years old. In fibres of this age it is difficult to imagine the source of the forces responsible for the expansion of fibres of considerable thickness.

In the Monocotyledon the different habit of leaf growth and absence of cambial activity would lead on just the same considerations to a different fibre distribution. Here again as leaf growth continues at the base of the leaf, although the vascular bundles multiply in number and to some extent in size over a considerable period, there is certainly not an increase in vascular cross-section commensurate with the increased longitudinal downward movement of food which will follow as more and more of the leaf lamina becomes adult.

The result is in this case a rapid increase in wall deposition which occurs first opposite the phloem of the bundle in the leaf and of the trace below but then extends often all round the bundle and is always most vigorous in the internode around those most recently differentiated bundles which are found towards the outside of the stem and which are differentiating basipetally.

One further point deserves brief mention here. In the leaf-tissues towards the end of the period of growth, small intermediate strands are internally differentiating basipetally. Some of these contain nothing but a few phloem elements, which later become surrounded by fibres. Thus considerable

¹ This problem has been included in the programme of the research work undertaken by the author under the auspices of the Indian Central Jute Committee.

significance attaches to the observation that other strands may differentiate at this time which contain nothing but fibres. (Wiesner has suggested that these are to be looked upon phylogenetically, as illustrating the gradual reduction of a small vascular strand, surrounded by a group of sclerenchyma to a fibre strand alone). They appear, however, worthy of further ontogenetic study, as from the present angle they look to be further support for the general standpoint that so much of this fibre tissue is to be regarded as originally phloem elements and there is no reason at present to refuse such elements the credit for a share in the work of longitudinal transport of food. (In *Urtica cannabina* the future bast fibres contain latex; in *Urtica dioica* special latex tubes are present besides the fibres. (Krabbe, 1887).

SUMMARY.

1. The anatomy of jute stem in different stages of development has been mainly described. In the young stem the vascular tissues are not arranged in the form of discrete bundles, but they form a continuous vascular ring from the beginning. The fibres which are all secondary in origin differentiate fully only in internodes which have ceased to grow in extension. Secondary phloem and secondary xylem are continually added on its two sides by the activity of the cambium. In the secondary phloem patches of fibres and soft phloem tissue are arranged alternately in radial seriation. The production of xylem is much greater than that of phloem.

2. Mucilage cells and canals are abundantly present in the stem, in the pith and in the cortical tissues. Crystals of Calcium oxalate occur widely in all the tissues except the xylem. Tannin in various forms is present in some varieties of *Corchorus cap-sularis*.

3. The phyllotaxy is $2/5$, but may be $3/8$ in vigorously growing shoot. Each leaf usually has 3 bundles, which enter the stem as a trilacunar trace. An attempt has been made to work out the course of the trace bundles in the stem axis.

4. The distribution of the fibres in relation to the leaf-trace system has been worked out in detail. Fibres are absent in the bundles of the leaf; but as the bundles enter the stem axis, fibres gradually differentiate in the traces at first towards the periphery of the trace and then centripetally towards the inner side. When the bundles properly take their position in the axis, cambial activity completely encloses the trace strands and new fibres continue to be formed on the outside.

5. Lastly, the problems of fibre differentiation, and distribution of fibres in relation to leaf-trace system have been discussed in detail in the light of previous literatures and of the present observations.

BIBLIOGRAPHY.

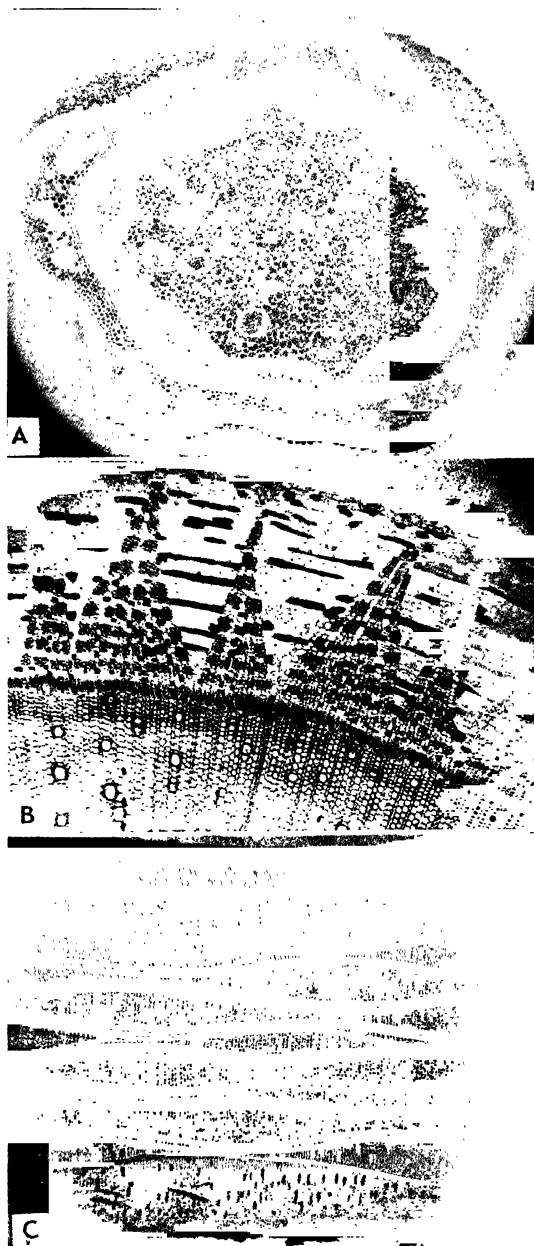
- Bary, A. de (1884). *Comparative anatomy of the vegetative organ of the Phanerogams and Ferns*. (Eng. Trans.) Oxford.
- Chowdhury, N. (1921). *Jute and jute substitutes*, Calcutta.
- Eames, A. J. and Mac Daniels, L. H. (1925). *An introduction to Plant Anatomy*, New York.
- Elliot, J. H. (1933). Growth and differentiation in the vascular system during leaf development in the Dicotyledon. *Proc. Leeds Phil. Lit. Soc. Sci. Sect.*, 2, 440-50.
- Haberlandt, G. (1914). *Physiological Plant Anatomy*. (Eng. Trans.) London.
- Krabbe, G. (1886). Das Gleitende Wachstum bei der Gewebebildung der Gefasspflanzen, Berlin.
- (1887). Ein Beitrag zur Kenntniss der Structur und Wachstums vegetabilischer zellhaute. *Jb. Wiss. Bot.*, 18, 346-424.
- Kundu, B. C. (1942). The anatomy of two Indian Fibre plants, *Cannabis* and *Corchorus*, with special reference to fibre distribution and development. *Journ. Ind. Bot. Soc.*, 21, 93-128.
- (1943). Anatomy of Jute Stem. Formation of network of fibres. Bulletin of the Ind. Central Jute Committee, 6.
- Meeuse, A. D. J. (1938). Development and growth of the sclerenchyma fibres and some remarks on the development of tracheids in some Monocotyledons. *Rec. Trav. Bot. Neerland*, 35, 288-321.
- Morot, Louis. (1885). Recherches sur le pericycle on couche periphérique du cylindre central chez les Phanerogames. *Ann. Sci. Nat. Bot.* (series). 20, 217-309.
- Mukherjee, N. G. (1921). *Handbook of Agriculture*, Calcutta.
- Patel, J. S. (1940, 41). Annual Reports of the Agricultural Research on Jute. Annual Reports of Indian Central Jute Committee, 1939-40, 1940-41.
- Prain, D. (1905). The vegetation of the Districts Hugli, Howrah and 24-Parganas. Records of the Botanical Survey of India, 3, Calcutta.
- Priestley, J. H. and Scott, L. I. (1936). Vascular anatomy of *Helianthus annuus* L. *Proc. Leeds Phil. Lit. Soc. Sci. Sect.*, 3, 159-73.
- Priestley, J. H. and Scott, L. I. (1938). *An Introduction to Botany*, London.
- Saito, K. (1901). Anatomische Studien über wichtige Faserpflanzen Japans mit besonderer Berücksichtigung der Bastzellen. *Jour. Coll. Sci.*, Tokyo, 15, 395-465.
- Tammes, T. (1907). *Der Flachsstengel*, Haarlem.
- Watt, G. (1908). *Commercial Products of India*, London.
- Wiesner, J. V. (1921). *Die Rohstoffe des Pflanzenreiches*, Dritter Band, Leipzig.

EXPLANATION OF PLATE FIGURES.

- Figure 1. Photomicrograph of transverse section of an extending stem of *Corchorus capsularis*. The glandular hairs on the surface of the stem can be seen. Note that the xylem has already formed a continuous ring. Note also the mucilage cells and the tannin-containing cells (dark black spots).
- Figure 2. Photomicrograph of a portion of transverse section from the base of a vigorously growing plant showing portion of the secondary xylem and a few secondary phloem wedges separated by wide rays.
- Figure 3. Photomicrograph of a tangential longitudinal section from near the base of a jute stem passing through the middle of the phloem wedges. Note the network of fibres separated by wide rays. Note also the distribution of the tannin cells in the rays and in the cortex. (The figure has been placed horizontally for accommodation in the plate.)

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**On two Salientian tadpoles, *Rana blanfordii* Boulenger
and *Bufo himalayanus* Günther, from the Ha Valley,
Bhutan, Eastern Himalayas.¹**

By JNANENDRA LAL BHADURI.

(Communicated by Dr. S. L. Hora.)

Sir B. J. Gould, Political Officer, Sikkim, collected a few tadpoles from a small lake near the Ha La, Bhutan, at an altitude of 13,000 feet, in May 1943, and forwarded them to Dr. S. L. Hora, Director of Fisheries, Bengal, for determination. Dr. Hora very kindly placed the material at my disposal for study. The small collection comprises four *Rana* and two *Bufo* tadpoles. Unfortunately, the latter were found in a slightly mutilated and shrivelled condition, but that did not interfere with their identification. The *Rana* tadpoles fall under the *Ranae liebiginæ* group (Boulenger, 1920), and I provisionally identified them as *R. blanfordii* Boulenger. The *Bufo* tadpoles, however, unquestionably belong to *B. himalayanus* Günther. Dr. Hora sent the identified specimens to Dr. Bains Prashad, Director, Zoological Survey of India, at Benares, for comparison with the named specimens. Dr. Prashad returned them with the following remark: 'These specimens agree fully with the named specimens in our collection.' I am grateful to Drs. Hora and Prashad for their kind courtesy in the matter.

***Rana blanfordii* Boulenger.**

(TEXT-FIG. 1.)

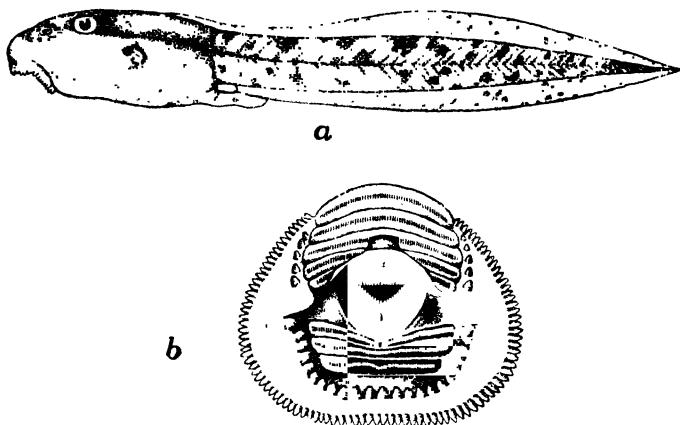
Boulenger's (1920, p. 84) description of this tadpole is very brief. Annandale (1908) described tadpoles secured by himself in Kumaon and in the Simla Hills as *vicina* larvae, but Boulenger (*op. cit.*) placed them under the synonymy of *R. blanfordii*. I identified the specimens at my disposal as *R. blanfordii* from Boulenger's account of dental rows in the mouth-disc, although they agreed in certain respects, especially in the nature of the labial papillae, with *R. liebiginæ* Günther, *R. annandalii* Blgr., and *R. assamensis* Sclater (Annandale, 1912, p. 21; Boulenger, 1920, pp. 77, 88). The descriptions provided by the above authors do not, in several points, fit in with those of the

¹ Contribution from the Zoology Department, University of Calcutta, 35, Ballygunge Circular Road, Calcutta.

tadpoles under report. In view of this, and as there is no diagram given of this species, or of *R. vicina*, I have written out the characters as seen in these tadpoles, supplemented by diagrams. The present description is based upon tadpoles with leg buds just appearing.

Head and body broadly ovoid, as seen from above, flattened above but not depressed, just a little less than twice its width; abdomen slightly convex, throat somewhat flattened; the tip of snout rounded.

Eyes and nostrils are by no means prominent; the latter laterodorsal, a little nearer to eyes than tip of the snout. Eyes superodorsal, moderately close together, and situated nearer the spiraculum than the end of the snout; the distance between the eyes almost equal to the internarial space.



TEXT-FIGURE 1. Tadpole of *Rana blanfordii* Boulenger, from Ha Valley lake, Bhutan, Eastern Himalayas, 13,000 feet: (a) lateral aspect $\times \frac{3}{4}$; (b) mouth-disc $\times 4$.

Mouth-disc is comparatively small and ventral, its greatest width equal to the interorbital width. The posterior lip directed backwards with a single row of rather small papillae running all along its margin, and, in addition, a second row of slightly larger papillae separated from the border row by a distinct space and completely encircling the three rows of teeth in the posterior lip. The anterior lip is directed forwards and inwards, the border row of papillae of the posterior lip is continued past the corners of the mouth-disc and for a short distance along the edges of the anterior lip. A few extra papillae at the inner corners of the anterior lip. Instead of being set directly on the lips, the teeth are arranged in rows along the crests of high fleshy ridges. It may be noted that some teeth rows from the anterior lip are apt to fall off, as I see at least in one individual.

Five rows in the anterior lip, the outer and second inner rows continuous; the third inner row lying just above the upper beak, and interrupted in the middle by a distinct notch; the remaining two rows successively much shorter and broadly interrupted in the middle by the intervention of the beak. The posterior lip contains three rows of teeth, only the first inner row very narrowly interrupted in the middle, the middle row as long as the first row; the outer row a little short. The dental formula: $2:3+3/1+1:2$. Both beaks massive, almost entirely bordered black and their margins strongly serrated. Upper beak crescentic but not wide; the lower one, broadly V-shaped.

Spiraculum sinistral, not tubular, slightly ventro-lateral, plainly visible from below, barely from above; its opening small, pointing backward and slightly upward, nearer the end of the snout than the vent.

Anus dextral, opening under a slightly longer fold of skin which overlies it and is continuous with the subcaudal crest.

Tail long and powerful, acutely pointed with crests almost equal in depth from middle to posterior end, nearly twice as long as head and body, and four to five times as long as deep. Crests, especially the upper one, somewhat shallow towards the base of the tail; these become deep gradually afterwards in the middle and then diminish again to a fine point posteriorly; upper crest extends a little over the back.

Sense-organs.—Apparently none. Only in the bigger specimen series of finely pitted sense organs are noticed arranged in lines on the anterior parts of the body. No parietal fleck was observed.

Glands.—Apparently none.

Coloration.—The body is uniform dark brown above; ventral sides, a little paler; tail mottled with brown spots. Outer coil of intestine slightly visible through the skin.

Dimensions.—The following are the measurements of three individuals in which the hind legs are just sprouting.

Measurements in millimetres.

	A	B	C
Total length	38.0	48.4	61.9
Length of head and body ..	13.5	16.4	20.5
Breadth of head and body ..	7.0	9.0	11.4
Greatest depth of tail ..	5.0	6.5	9.5

Distribution.—Boulenger (1920) examined tadpoles of *R. blanfordii* from Bhim Tal, W. Himalayas, 4,450 feet, received by him from the Indian Museum in 1915. Tadpoles under the name of *R. vicina* from near Phagu, Simla district, 7,000 feet, also received from the Indian Museum in 1909, were placed by him under this species; evidently these were the tadpoles on which

Annandale (1908) based his description of *R. vicina* tadpoles. Boulenger quotes Annandale to show that *R. blanfordii* is very common in the Western Himalayas at altitudes from 6,000 to 10,000 feet. The find of *R. blanfordii* tadpoles in Bhutan in the Ha Valley lake at an altitude of 13,000 feet, in the Eastern Himalayas, is not only an additional record, but it considerably extends also the altitudinal distribution of the species.

Bufo himalayanus Günther.

Annandale (1906) first described the tadpoles of this species secured by himself from some small artificial ponds at Kurseong and Darjeeling (5,000–7,000 feet). Annandale (1912, p. 19), under the heading of this species, expresses the difficulty that is often felt in separating this species from its close ally *B. melanostictus*, as typical individuals of the latter are also found to ascend considerable altitudes in the Himalayas, but in reference to tadpoles he notes: 'Tadpoles (plate iv, fig. 7), however, from above 4,000 ft. in the E. Himalayas can, so far as my experience goes, be distinguished from those found in the plains of India by the fact that the eyes are not prominent but rather sunken. Tadpoles from the plains agree well with one from the Malay Peninsula figured by Flower (*P.Z.S.*, 1896, p. 911, pl. xlv, fig. 3), and I have found similar specimens at an altitude of over 7,000 ft. in the W. Himalayas near Naini Tal.' Further, in reference to coloration, Annandale's (1906, p. 289) observation, 'colour almost uniform inky black, slightly less intense on the ventral than the dorsal surface', may stand up in good stead in separating the two species. The specimens under my observation show this inky coloration quite vividly. Attention may also be drawn to the configuration of the tail in the tadpoles of two species for an additional point of distinctness. In *B. himalayanus* tadpoles the tail-end is slightly more tapering (*vide* Annandale, 1912, pl. iv, fig. 7) than that of *B. melanostictus* (*vide* Pope, 1931, p. 454, Fig. 6*b*).

So far as my information goes, the tadpoles of *B. himalayanus* have not been recorded above 7,000 feet. Now, the record of two tadpoles in Bhutan in a small Ha Valley lake, at an altitude of 13,000 feet, in the Eastern Himalayas, considerably extends the altitudinal breeding sites of *B. himalayanus*.

SUMMARY.

Tadpoles of *Rana blanfordii* Boulenger and *Bufo himalayanus* Günther, have been recorded for the first time from the Ha Valley lake, Bhutan, in the Eastern Himalayas, at an altitude of 13,000 feet. This considerably extends the altitudinal breeding sites of the two species, and especially the distribution of the former. A description of *R. blanfordii* tadpoles has been given, illustrated by diagrams, as the previous description on them are brief and inadequate.

REFERENCES.

- Annandale, N., 'Notes on the Freshwater Fauna of India. No. VIII.—Some Himalayan tadpoles.' *Journ. Proc. Asiat. Soc. Bengal*, N.S., II, pp. 259-262 (1906).
 ———, 'Description of the tadpole of *Rana pleskii*, with notes on allied forms.' *Rec. Ind. Mus.*, II, pp. 345-346 (1908).
 ———, 'Zoological Results of the Abor Expedition, 1911-12. I. Batrachia. *Rec. Ind. Mus.*, VIII, pp. 7-36 (1912).
 Boulenger, G. A., 'A Monograph of South Asian, Papuan, Melanesian and Australian frogs of the Genus *Rana*.' *Rec. Ind. Mus.*, XX, pp. 1-226 (1920).
 Pope, C. H., 'Notes on Amphibians from Fukien Hainan, and Other Parts of China.' *Bull. Amer. Mus. Nat. Hist.*, LXI, pp. 397-611. (1931).

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A List of Plants recorded from the Pāts of Ranchi and Palamau Districts and the States of Jashpur and Surguja.

By H. F. MOONEY.

In the extreme south of Palamau and along the western fringe of Ranchi district there occurs a series of flat-topped hills, sometimes forming considerable plateaux, which extend into the States of Jashpur and Surguja where they occupy large areas. These table-lands, locally known as 'pāts', are remarkable for the level nature of their summits, which have a general altitude of 3,400 to 3,800 feet above sea-level. The best known of these is Netarhat (3,500–3,700 ft.) in Palamau district, which provides a summer resort for the Governor of Bihar and was at one time even considered as a possible site for a hill station in that province. Pakari Pāt, which adjoins Netarhat on the south, is larger and has a number of small outliers. These two plateaux are separated from similar formations in Surguja and Jashpur by the intervening valleys of the Barwe in Ranchi and Chechari in Palamau.

The Khudia estate in Jashpur covers an area of about 400 square miles and is made up of numerous *pāts* dissected by many valleys and ravines, which form the upper sources of the Ib and Kanhar rivers and constitute the watershed between the Ganges and the Mahanadi basins in this region. The Ib flows south to the Mahanadi, which it joins near Sambalpur, while the Kanhar flows northwards to fall into the Son in Mirzapur district and thus reaches the Ganges. The average level of the Jashpur *pāts* is 3,300 to 3,400 feet, culminating in Pendra Pāt (3,600 ft.) at the extreme westerly end of the range on the borders of Surguja. The Jashpur *pāts* are small by comparison with those of Surguja and Ranchi.

Surguja has two *pāts*: the Mainpāt and Samri Pāt. Both of them are very extensive. The Mainpāt, which is the better known, is some 25–30 miles long by five to six miles across at its widest part and has a general altitude of 3,500–3,800 feet. It lies some thirty miles west of the highlands of Jashpur, from which it is separated by the wide plain of the Mand river, a tributary of the Mahanadi, and some 60 miles south-west of Samri. Samri Pāt is not so vast as the Mainpāt but has an overall area of some 30 square miles. Its general level (3,600–3,800 ft.) is only slightly higher than the Mainpāt; but it possesses a small outlier west of the Kanhār which attains

4,018 feet. This is Lahsun Pāt, which is the highest point in this region.

Although not actually one of the *pāts* I propose to mention Marual Hill, which lies only a few miles south of the Khudia plateau in Jashpur. I examined this range and it is sufficiently close to the plateau lands to be brought within the scope of this paper.

Similar flat-topped hills and table-lands are again encountered further west at Amarkantak (3,473 ft.) and in the districts of Mandla and Balaghat, where their southerly spurs project into Kawardha State and along the northern fringe of the Chhattisgarh plain. These Kawardha 'dādars' were also examined but they lie too far outside the area dealt with in this paper to be included in it. They belong to the Maikal range in the Central Provinces.

Geology.—The fundamental geological structure of these table-lands is a massive granite-gneiss, possibly Chota Nagpur granite-gneiss. This appears to be fairly uniformly covered at a level of about 3,000 to 3,300 feet by a flow of basic igneous rock (epidiorite) to a depth which has not been ascertained but which may be as much as 300–500 feet; and in the case of the Mainpāt is definitely much more. It seems likely that this latter rock is an easterly extension of the Deccan Trap, which was possibly prolonged still further eastwards as far as the Rajmahal Hills in the Santal Parganas and may at one time have overlain much of the Chota Nagpur plateau, from which all traces of it have long since been eroded away. This flow of basic rock is in its turn capped by laterite for the most part; and it is this latter rock with which we are principally concerned when studying the vegetation of the hill tops. The laterite cap appears to be at least 50 feet deep in places; but, although it may be more, it does not seem to exceed 100 feet anywhere. Bauxite of very good quality occurs throughout these hills, notably on the Mainpāt and parts of Samri; while red and yellow clays were seen on parts of the Mainpāt. The geological formation of the Mainpāt differs from that of the other *pāts* to some extent. At its eastern extremity, the basal rock is granite-gneiss, as in the other areas, but the depth of overlying epidiorite is much greater; while at the western end of the plateau these trappean rocks have a depth of from 1,500 to 2,000 feet and rest directly on the Gondwana sandstones at an elevation of about 2,000 feet in Lakhanpur estate, whence the latter extend to the north and west for many miles.

On the Kawardha *dādars*, the laterite cap appears to be much thinner and, more often, completely absent. As a result, the plateau lands are covered in a black soil resting thinly on the trap instead of the red lateritic soils, which characterize the *pāts*.

Climate.—The climate of the *pāts* is mild, at times almost temperate, the maximum shade temperature rarely exceeding 100°F. even in May. Of all the plateaux, it is probable that Samri Pāt enjoys the coolest climate. During the winter months, from November to February, frost occurs quite frequently but is rarely very severe or prolonged. In fact, it more generally partakes of the nature of a ground frost, its effects being most apparent in depressions on the open grasslands, such as are met with extensively on Samri and the Mainpāt, which are rather more open than the others; but its effects were also observed at high elevations in Khudia, and frost is well known to occur at Netarhat.

Month.	Rainfall in inches.	
	Netarhat. 3,700 ft.	Jashpur-nagar. 2,500 ft.
January	1.18	0.98
February	2.09	1.37
March ..	0.69	1.55
April ..	0.53	0.67
May ..	1.66	1.37
June ..	8.34	6.82
July ..	21.37	20.70
August ..	18.83	17.24
September	9.85	10.19
October	3.85	3.86
November	1.72	1.16
December	0.51	0.35
TOTAL ..	70.62	66.46

Rainfall figures from Netarhat for the 17-year period 1922-38 give an average precipitation of 70.62 inches, while records from Jashpurnagar show an average of 66.46 inches for the 20 years 1922-41. The new recording station at Pendrapat in Jashpur was opened only four years ago and unfortunately the total annual precipita-

tion is all that is available from this interesting high-level station. The average rainfall at Pendrapat for the four years 1938-41 amounted to 56.60 inches. While it must be admitted that such a short period is insufficient to give conclusive results, it is strange that the rainfall recorded at 3,600 feet is less than that at Jashpur (2,500 ft.). The figures for Netarhat are more in accord with what one would be led to expect, although they too do not record a heavy precipitation. It is a pity that no data are available from the *pāts* of Surguja; but it seems safe to say that the variation will not be very great and that the figure will be between 55 and 70 inches.

The flora itself reflects the climate; and it is certainly not a moist type of vegetation that we find on the *pāts*. Even in the ravines, evergreen species are far from abundant; ferns are rare in number and few in species; and epiphytic orchids (apart from *Dendrobium crepidatum*) are scarce. While the total annual precipitation is certainly not deficient and may be described as moderate, it will be noted that its distribution throughout the year is very uneven. Thus, the climate of the *pāts* is decidedly dry from November to the end of May, the average *monthly* rainfall during these seven months being less than two inches. This is in strong contrast with the conditions found in the mountains of Orissa in the States of Mayurbhanj and Kala-

handi, and Puri district, and in the Eastern Ghats with their much more humid climate, tempering sea breezes and complete absence of frost; all of which factors combine to produce a vegetation of a distinctly moist or evergreen character. Besides the generally more humid atmosphere, due to the proximity of the sea, the rainfall in the Mayurbhanj mountains and on the Kalahandi plateau is of the order of 80 to 100 inches, while Bailadila Hill in Bastar State, although situated further inland, has about 80 inches of rain. All these are appreciably higher figures than those recorded from the *pāts*, where the maximum probably does not exceed 70 inches and where the average may be considerably less, very likely 60 to 65 inches. This absence of a heavy rainfall combined with moderate temperatures and a rather prolonged cold season from October to March, tend to favour a flora of a not very moist type; a fact which will be manifest from the list which follows. The effect of frost is probably not very far-reaching. Its effects are little in evidence in the closed forest; but on the plateau lands, and more especially in depressions, it kills back sal saplings and other second-growth and is thus a delaying factor in the recolonization of the grasslands by trees. It is not, however, so severe as to inhibit completely the gradual spread of the forest; the young seedlings becoming slowly established under the protection afforded by the larger trees along the fringe of the closed forest, whence gradually, perhaps very gradually, they can extend their range.

Another factor, which cannot be entirely overlooked and which also exercises an adverse effect on the process of recolonization, are the high winds that sweep across the plateau lands at certain times of year, particularly during the months of March and April and sometimes during the monsoon months. Those occurring during the hot season must have a desiccating effect on the vegetation, the more so as the laterite caps of the hills provide very dry sites for the most part with only a thin soil covering and little soil moisture. In this respect also the *pāts* are in contrast with the hills of Orissa, where perennial streams are moderately plentiful and the soils deeper, richer in organic matter and more retentive of moisture.

Biotic Factors.—The people inhabiting these highlands are, for the most part, Uraons; an aboriginal tribe widely distributed over the western half of Ranchi and the southern portion of Palamau districts and in the States of Jashpur, Udaipur and in the southern part of Surguja but not on the Mainpāt. They have settled down and taken to cultivation for many years; but there is no doubt that in former times they indulged extensively in shifting cultivation, which came to an end only with the disappearance of the forest over most of the tract inhabited by the tribe. Besides the Uraons, the Korwas (a less numerous but much wilder people) are found inhabiting the plateau lands

and the slopes of the *pāts* in western Jashpur and in Surguja. Some of the members of this latter tribe have, it is true, settled down to a fairly stable form of agriculture in Jashpur; but the Hill Korwas in Khudia and in Surguja do not take kindly to the plough; and it is only during the past three or four years that their destructive method of raising crops, locally known as 'beora', has been restricted following the reservation of most of the remaining forests in these hills.

Another important factor with a very considerable influence on the vegetation is the extent to which large herds of buffaloes are pastured on the *pāts* by professional graziers, or Ahirs, many of whom are seasonal immigrants from the districts of Mirzapur and Palamau to the north of our area. The graziers form semi-permanent camps called '*bathāns*', where they herd their buffaloes, especially during the monsoon months. These graziers frequently hold a little temporary cultivation and raise crops such as mustard (*Brassica campestris*) on the summits of the *pāts* on heavily manured upland; and some of them are understood to have acquired occupancy rights in recent times and have settled down permanently.

The effect of these two main factors on the original vegetation has been to reduce a great part of the forest to grassland. This is especially the case on the flat tops of the hills, where cultivation is also possible and where heavy grazing combined with dry-cropping every third or fourth year successfully inhibits any progress towards the climax. The valley bottoms have mostly been terraced and placed under rice; the flat hill tops are maintained as grassland by the combined effects of heavy grazing, dry cultivation and by the fires which sweep across the hills each year during the months of March and April. These fires, which are usually started by the graziers with the object of getting a fresh crop of grass, effectually kill off, or at any rate cut back, all seedlings of tree species seeking to establish themselves in the grassland community. Once the hill-slopes have been deserted following shifting cultivation, there is a clear tendency for them to revert to forest but this tendency is held in check by the two dominant biotic influences: grazing and fire.

The villages of the Uraons are usually situated in the valleys or on the lower spurs and slopes of the hills adjoining their cultivated lands. The Korwas, on the other hand, generally inhabit the summits of the *pāts*. As a result, the latter have little or no riceland but cultivate mainly such crops as the small millet, *gundli* (*Panicum miliare*), both the small early and larger late varieties, *rahar* (*Cajanus indicus*) and the earlier and smaller variety *kandul*. *Jatangi* or *surguja* (*Guizotia abyssinica*) is widely grown as an oil-seed and is very striking when in flower in October and November, the yellow fields of this crop being characteristic of these hills. Upland rice and *urid* (*Phaseolus*

mungo) are widely cultivated and are reaped in September and October. *Mung* (*Phaseolus radiatus*) is not so common and is grown as a second crop. *Kulthi* (*Dolichos biflorus*) and *marua* (*Eleusine corocana*) or *mandia* are raised to some extent but not in the same abundance as on the lower Ranchi plateau. *San* hemp (*Crotalaria juncea*) is grown in small patches and *makai* (*Zea mays*) is to be found on most *baris* or homestead lands and on the *bathans* where buffaloes have been herded. *Rasi* or sesamum (*Sesamum indicum*), which is a common oil-seed at lower elevations, does not appear to be grown on the *pāts* or, if it is, then rarely. Besides these field crops numerous plants of the cucumber family, as well as yams (*Dioscorea* spp.) and climbing beans, chief among which is *Dolichos lablab*, are grown on fences surrounding the homesteads and on the housetops.

The vegetation.—The most striking feature of the area are the open grasslands covering the flat summits of the *pāts*. In many cases, these open pastures are unbroken by hardly a single tree; or, if some woodland is to be seen, it generally takes the form of small copses of *sal* saplings seldom more than ten years old just emerging from the effects of *beora*, or else a '*sarna*' or sacred grove, where one may see some of the original *sal* forest, which once undoubtedly covered the whole of these table-lands.

Beyond listing a number of interesting species found on the *pāts*, Haines (*Botany of Bihar and Orissa*, page 4 of Introduction) does not discuss the general vegetation. He suggests that the *pāts* may have 'served as stepping stones for the passage of species from the highlands of the Peninsula to the newer Himalayas, or in some cases, in the reverse direction'.

These grasslands are very clearly the outcome of the biotic factors enumerated above and are, very possibly, of no great age. It is thought probable that most of them have been in existence for as little as eighty to one hundred years or, in some cases, possibly more. But it is doubtful if the permanent or even semi-permanent status of the grassland is of much greater antiquity. This is evident from the fact that over much of the area the forest has clearly receded only in very recent times; and there are numerous instances along the fringe of the jungle where the closed forest and grassland are in a condition of unstable equilibrium. It seems probable that it is only during the past century that the population has been such as to make a permanent impression on the original vegetation, which must have been closed forest, and has been able to convert it, for the time being, to permanent grassland. I say 'permanent' because over a great part of the plateau lands, the grassy subclimax has become so firmly established that it has assumed an aspect of permanency; although it is freely admitted that if all adverse biotic factors were eliminated (amongst which I include fire), the grassland would ultimately revert to

forest. The ecological status of the grassland is not, therefore, that of a climatic climax in the sense of Clements. It is permanent so long as the controlling factors, climatic and biotic, are operative but will progress towards the climax (sal forest in this case) with their removal or suppression. It is a *pro-climax*.

The grasslands of the *pāts* are definitely superior as pasture to those met with at lower altitudes. This superiority must be attributable to climatic factors, since the incidence of animals is quite as heavy as elsewhere and soil conditions do not differ essentially. The composition of the sward does not seem to diverge radically from that found at lower elevations but is decidedly more luxuriant. The only species at all peculiar to the *pāts* are *Eragrostis tenuifolia*, *Sporobolus piliferus* and perhaps *Andropogon ascinodis*. *Coelachne simpliciuscula*, a high-level grass, was collected at Kedma (2,000 ft.) below the Mainpāt and will probably occur at the higher levels, although it was not actually seen on any of the plateaux. *Chrysopogon aciculatus* and *Perotis latifolia* are both rare on the *pāts* but tend, nevertheless, to appear wherever overgrazing is acute. They become increasingly frequent below 3,000 feet and are, of course, very common species in the plains. These grasslands are best seen in September and October when growth is at its height. By the end of December they have been heavily grazed; and by February the annual fires have commenced, which blacken the surface of the *pāts* until the monsoon breaks and the early rains bring forth the new flush of leaves in fresh profusion.

The most conspicuous associate of the grasses in these hills is *Euphorbia prolifera*, a plant peculiarly characteristic of the grasslands on the *pāts*. I have never seen this herb on any of the higher hills south of Khudia or the Mainpāt, although many of the summits of the Singhbhum hills (notably Karampada and Budha Buru), the mountains of Orissa or the plateau lands of Kalahandi would seem to be equally suitable habitats for it. The *Leguminosae* figure prominently among the more common associates of the grasses such as *Alysicarpus bupleurifolius*, *A. vaginalis*, *Atylosia scarabaeoides*, *Crotalaria acicularis*, *C. medicaginea*, *C. prostrata*, *C. sericea* (near streams), *Desmodium triflorum* and *Lespedeza sericea*. Other common herbs of the grasslands are *Artemesia parviflora*, *Bupleurum mucronatum* (on banks), *Chrysanthellum indicum*, *Conyza stricta*, *Eulophia campestris*, *E. flava*, *Micromeria biflora*, *Ochna pumila*, *Oldenlandia gracilis*, *O. dichotoma*, *O. hispida*, *Peucedanum dhana* (banks), *Polygala chinensis*, *P. elongata*, *P. persicariaefolia* (r.), *Premna herbacea*, *Pulicaria angustifolia*, *Pycnocycla glauca*, *Ruellia suffruticosa*, *Senecio nudicaulis* (v.a.), *Smithia conferta* (wet grasslands), *Striga lutea*, *Tricholepis stictophyllum*, *Viola Patrinii*, *Youngia acaulis* and many more.

Interesting plants are often found along the streams on the *pāts* over 3,500 feet both on the banks above the stream and bordering the water's edge, among which the most characteristic or interesting are: *Adenostemma viscosum*, *Buddleia asiatica*, *Burmannia coelestis*, *Cephalostigma Schimperii*, *Conyza viscidula*, *Cynoglossum denticulatum*, *C. lanceolatum*, *Crataegus crenulata*, *Dysophylla auricularia*, *D. cruciata*, *D. pentagona*, *Ehretia acuminata*, *Eriocaulon collinum* (in streams), *E. longicuspis* (swamp), *E. oryzetorum* (swamp), *E. quinquangulare* (wet ground), *Exacum tetragonum*, *Floscopa scandens*, *Hedychium coronarium* (swampy ground), *Hydrocotyle asiatica* (v.a. on banks), *H. rotundifolia*, *Hypericum Gaitii*, *Jasminum strictum*, *Juncus prismatocarpus*, *Justicia quinquangulare*, *Limnophila gratioloides*, *L. gratissima*, *Lobelia trialata*, *L. trigona*, *L. zeylanica*, *Lysimachia obovata*, *Mazus rugosus*, *Micromeria capitellata*, *Mimulus gracilis*, *Mosla ocymoides*, *Osbeckia rostrata*, *Plantago major*, *Polygonum chinense*, *P. flaccidum*, *P. serrulatum*, *P. strigosum*, *Potentilla Kleiniana*, *P. Leshchenaultiana*, *Pouzolzia pentandra*, *Pyrus Pashia*, *Ranunculus pensylvanicus*, *Rhamnus virgatus*, *Rubus ellipticus*, *R. rugosus*, *Sonchus arvensis*, *Sopubia stricta*, *Spilanthus acmella*, *Utricularia coerulea*, *U. Wallichii*, *Xyris coronata* (swamp), *Zornia diphylla* and numerous sedges, the most typical being *Fimbristylis aestivalis*.

The Forest.—The existing forest, whether found on the slopes leading up to the plateaux, or as second-growth on their summits resulting from shifting cultivation, or forming sacred groves near villages in the high valleys or on the *pāts*, is uniformly of one type—plateau *sal*. This community is on the whole rather poor in tree species other than *sal*, which usually forms from 85 to 95 per cent of the crop. Several of its common associates at lower elevations such as *Anogeissus latifolia*, *Buchanania lanzan* and *Diospyros melanoxylon* are far from abundant; and the *mahua* tree (*Madhuca latifolia*) and *Cleistanthus collinus* are either absent or exceedingly rare over 3,000 feet. Many, if not most, of the commoner associates at lower altitudes are, however, found, such as *Antidesma diandrum*, *Bauhinia retusa*, *B. Vahlia*, *Bursera serrata*, *Careya arborea*, *Cedrela toona*, *Croton oblongifolius*, *Embllica officinalis*, *Eugenia glaucissima* (lva), several *Ficus* spp., *Glochidion lanceolatum*, *G. velutinum*, *Indigofera Hamiltonii*, *I. pulchella*, *Kydia calycina*, *Millettia auriculata*, *Mangifera indica* (in cool valleys), *Ougeinia dalbergioides*, *Pavetta indica*, *Premna flavescens*, *Randia dumetorum*, *Schefflera Roxburghii*, *Symplocos racemosa*, *Syzygium jambolanum*, *S. operculatum*, *Vangueria pubescens* and *Wendlandia tinctoria* to mention some of the trees, shrubs and larger climbers. *Bauhinia retusa*, *Bursera*, *Cedrela toona* and *Croton oblongifolius* are on the whole the most characteristic. *Glochidion velutinum* is particularly conspicuous on the Mainpāt but does not seem to be so common on the other *pāts*. Even in ravines

in the hills there is nothing that can be described as evergreen forest, although a few individuals are to be found that can be classed as such, e.g. *Artocarpus lakoocha*, *Entada scandens* (vr.), *Gnetum scandens*, *Linociera intermedia*, *Litsea chinensis*, *Machilus macrantha*, *Meliosma simplicifolia*, *Pittosporum floribundum*, *Pygeum Andersoni* and *Xylosma longifolia*. These are found occasionally near perennial streams in the hills but they occur as isolated trees and do not themselves form a community that could be differentiated from the main *sal* forest association. That this *sal* association is the climatic climax for the area appears to be quite certain. The grassland is entirely seral in status and there seems to be little doubt that it would revert fairly rapidly to the climax if protected from adverse factors. The greatest permanent obstacle to a rapid transformation is probably frost.

Of all the plateaux, Netarhat is the best forested. This is due to the fact that the slopes and much of the plateau itself were constituted a government reserved forest over fifty years ago. The summits of the *pāts* in the west of Jashpur and also the Samri Pāt and Mainpāt in Surguja are very open and bare of tree growth. This may be attributed to the fact that they are situated in the midst of the Korwa country and the lack of woodland is undoubtedly due to the destructive proclivities of these primitive people in the recent past.

As has already been suggested, these table-lands would appear to have a considerably less humid climate than that of the Orissa hills and the Eastern Ghats. This would account for the rather poor display of ferns and for the comparative scarcity of orchids (especially epiphytes) and for the absence of certain species characteristic of the Orissa region. For instance, *Memecylon edule* is typical of ravines in laterite on the summits of the Kalahandi hills (3,500–4,000 ft.) and has been noted on Malyagiri Peak (3,895 ft.) in Pal Lahara State, Orissa. It also occurs abundantly on low rocky hills about 150–200 feet elevation in Athgarh State and Cuttack district. This little tree does not seem to range further north than Malyagiri Hill. Similarly, *Dysophylla quadrifolia*, which is abundant and very characteristic on exposed laterite hill-tops and plateau lands throughout Orissa does not appear to extend further north than Singhbhum district. At least, it was nowhere observed on any of the *pāts*, although its presence was expected and it was, in consequence, searched for. Again, the tree ferns *Alsophylla glabra* and *Cyathea spinulosa*, which have been found in Kalahandi and Keonjhar States and as far north as Bonai State in Orissa, were not noted in the present area. The absence of these tree ferns, as well as the general scarcity of evergreens is indicative of a generally drier climate than that of the mountains of Orissa.

Frequency of Families.—Although the material available is perhaps rather too scanty to give conclusive results, a very fair indication of the numerical strength of the more important families can be obtained from an analysis of the list of plants which follows and which contains 630 species, including Cryptogams. The ten families of Angiosperms containing the greatest number of species are listed below together with the sequence of families for Bihar and Orissa as set forth on page 31 of the Introduction to Haines' *Botany* for the sake of comparison.

Sequence for the Pāts.	Sequence for Bihar and Orissa.
I. GRAMINEAE (79)	II.
II. LEGUMINOSAE (74)	I.
III. COMPOSITAE (38)	IV.
IV. CYPERACEAE (33)	III.
V. ORCHIDACEAE (30)	VIII.
VI. LABIATAE (22)	IX.
VII. RUBIACEAE (20)	VII.
VIII. ACANTHACEAE (18)	VI.
IX. EUPHORBIACEAE (18)	V.
X. SCROPHULARIACEAE (17)	X.

The *Rosaceae* are represented by eight species and the Umbelliferae by eleven.

The two most noticeable changes in these two lists is the fall of the Euphorbiaceae from fifth to ninth place and the advance of the orchids from eighth to fifth place. The latter is partially explained by the fact that these plateaux were carefully searched for orchids by Revd. Father Cardon, S.J., who collected in the neighbourhood for several years. Most of the records are his and, were it not for them, this family would hardly appear in the list at all.

The following are new records for the area covered by Haines' *Botany of Bihar and Orissa*, which embraced the States of Surguja and Jashpur on account of their being geographically a part of Chota Nagpur.

<i>Crataegus crenulata</i> Roxb.	<i>Rynchospora gracillima</i> Clarke.
<i>Pyrus Pashia</i> Ham.	<i>Scleria annularis</i> Kunth.
<i>Acanthospermum hispidum</i> DC.	<i>Eragrostis tenuifolia</i> Hochst.
<i>Ficus palmata</i> Forsk.	<i>Sporobolus piliferus</i> Kunth.
<i>Plantago major</i> Linn.	

Endemics.—*Hypericum Gaitii*, *Jasminum strictum* and *Ligustrum alboalatum* appear to be endemic to the area covered by this paper, except that I have slightly extended the range of the first, which I have found on Malayagiri Hill in Pal Lahara State, Orissa, a good many miles to the south. All three were found by Haines at Netarhat and named by him; and all three

have been collected by me in Surguja, either on Samri or the Mainpāt. They have not been observed below 3,500 feet.

Plectranthus ternifolius, *Rhamnus virgatus* and *Rubus ellipticus*, although not endemics, are very characteristic of hills over 3,500 feet. The first two appear to be confined to this region and to these levels in the province of Bihar and Orissa, both having been recorded by Haines from Netarhat and the pāts of Chota Nagpur. The first was collected by me near Dumar-kona in Jashpur and the *Rhamnus* on dry sites among laterite boulders near streams on the Mainpāt in Surguja. *Rubus ellipticus* has a much wider distribution in the province but individual records are few. It has been recorded by Haines from the Mayurbhanj Hills and I have collected it at just over 3,000 feet on the Kasipur plateau in Kalahandi. It seems to be very rare in the area now under review, as I only saw two plants on the bank of the Macheri nala near Laliya village about 3,600 feet elevation on the Mainpāt in Surguja. *Rubus rugosus*, on the other hand, is fairly common along streams on the Mainpāt and also occurs on Samri, although not, apparently, in Jashpur.

Two plants of peculiar interest were found. They are *Crataegus crenulata* and *Pyrus Pashia*. Neither is listed as occurring in the Nilgiris or in any of the other mountains of the Peninsula. The former shrub was found in one limited locality only—on a high bank of a stream just below the village of Nawadih on Samri Pāt at about 3,700 feet. Only a few bushes occur here, and it was seen nowhere else. This is a Himalayan plant and has not been recorded nearer than the Kumaon Hills. It was flowering in May when collected. The *Pyrus* was found only on the Mainpāt, where it was observed in two localities. Three trees were noted in the Laliya valley on the bank of the stream; and in the Kamaleswarpur valley at least ten specimens were seen between 3,600 and 3,700 feet, always very close to the nala and often overhanging the water, though not rooting quite so close to the water's edge as the willows. This is the first record of this tree in the province or in the Peninsula, its normal habitat being the temperate Himalaya between 2,500 and 8,000 feet from Kashmir to Bhutan; and also Afghanistan, the Khasi Hills and Manipur.*

Below is given a list of all plants collected or noted by me in the area dealt with, to which I have added species recorded by Haines in his *Botany of Bihar and Orissa* as occurring at

* NOTE:—Since writing the above, specimens of *Berberis asiatica* Roxb. and *Cudrania javanensis* Trecul have reached me from the Mainpāt in Surguja where they were collected in a valley at 3,600 feet. The former has been recorded only from Parasnath and from Dhupgarh in the Pachmarhi Hills, both over 4,000 feet. It does not seem to have been found elsewhere south of the Himalayas. *Cudrania javanensis* has been recorded by Haines from N. Champaran and Purneah but not elsewhere in the province.

Netarhat or on the higher hills of the Ranchi and Palamau districts. The great majority of records have been made at altitudes exceeding 3,000 feet but in some cases elevations down to 2,500 feet have been included. Short notes are given of the habitat and locality in which each plant was observed.

Ranunculaceae.

1. ***Clematis gouriana** Roxb. Recorded from near Netarhat by Haines. Not observed by me in Jashpur or Surguja.

2. ***Ranunculus pennsylvanicus** Linn. Occasional on Samri Pāt, Surguja, in mud near streams and swampy ground; Sarangjobi, 3,500–3,700 feet. Not seen in Jashpur or on the Mainpāt; and I doubt if it occurs in those areas. 'Koorgee 3,000 feet, Netarhat and the higher hills of Chota Nagpur.' (Haines.)

3. ***Thalictrum foliolosum** DC. 'Netarhat and higher hills of Chota Nagpur, 2,500–4,000 feet.' (Haines.) Very rare in Surguja. Collected only once on Samri Pāt at 3,700 feet. Rare and local in Jashpur, generally under shade in the forest above 3,000 feet. I have very seldom found this plant below 3,000 feet either here or elsewhere, although I see that Haines records it down to 2,500 feet. It is certainly rare below the former elevation.

Dilleniaceae.

4. **Dillenia aurea** Sm. Recorded from Jashpur and Netarhat by Haines. It is probably scarce, as I did not observe it either in Jashpur or Surguja.

Magnoliaceae.

5. ***Michelia champaca** Linn. Recorded as rare at Netarhat by Haines. Not observed and almost certainly completely absent from Surguja; but several specimens were seen along a stream at the head of the Kardhana valley (3,000 ft.) in Jashpur. The conditions in the Pendra valley at Netarhat and in Jashpur, being moister, would be more favourable to the tree than the drier conditions prevailing, even in the valleys and ravines, in Surguja.

Anonaceae.

6. **Miliusa velutina** Hook. f. & Th. Occasional in hill forest, especially on the cooler aspects, 2,500–3,000 feet. Jashpur.

* Characteristic of elevations over 3,000 feet.

7. **Saccopetalum tomentosum** Hook. f. & T. More abundant than *Miliusa* and generally in drier situations. Jashpur and Surguja, 2,500–3,000 feet. Not common above 3,000 feet.

Menispermaceae.

8. ***Cissampelos pareira** Linn. In hill forest up to 3,500 feet. Collected on Dhaura Pāt, 3,400 feet, Jashpur.

Papaveraceae.

9. **Argemone mexicana** Linn. Locally gregarious near cattle stands on the Mainpāt, Surguja, 3,600–3,800 feet. An introduced weed.

Cruciferae.

10. **Brassica campestris** Linn. Cultivated on *baris*, or more extensively on land where cattle have been herded. Surguja and Jashpur up to 3,500 feet.

Violaceae.

11. **Ionidium suffruticosum** Ging. Abundant up to about 3,000 feet throughout the area. Occurs, but is not so common at higher altitudes.

12. †**Viola Patrinii** DC. Netarhat (Haines).

13. †**Viola tricolor** Linn. Haines observes, 'This is said to occur in cultivated fields on Pakari Pāt, 3,000 feet, but I have not seen it.'

Bixaceae.

14. **Cochlospermum gossypium** DC. On southern slopes of dry, rocky hills up to about 3,000 feet in Jashpur and on the southern slopes of the Mainpāt but not observed above this elevation.

Flacourtiaceae.

15. **Casearia graveolens** Dalz. In sal forests in Surguja up to 3,200 feet and will probably be found in Jashpur also.

16. **Xylosma longifolia** Benth. Not uncommon in ravines under shade over 2,500 feet. Collected in Jashpur at Gullu, 3,000 feet and seen in several ravines about the same elevation. Not so common in Surguja. Recorded by Haines from Netarhat.

* NOTE :—8a. *Berberis asiatica* Roxb. has now been collected on the Mainpāt, Surguja State, at 3,600 feet.

† Characteristic of elevations over 3,000 feet.

Pittosporaceae.

17. ***Pittosporum floribundum** W. & A. Frequent along rocky streams on the Mainpāt, Surguja, 3,200–3,600 feet but not observed elsewhere although it probably occurs. Recorded by Haines along ravines at Netarhat. Appears to be partial to laterite.

Polygalaceae.

18. **Polygala chinensis** Linn. In heavily grazed pasture land, Bene, 1,500 feet, Jashpur; but it will almost certainly be found at higher altitudes.

19. **Polygala elongata** DC. In dry pasture, 2,500 feet, Kapsela, Jashpur.

20. **Polygala leptalea** DC. Very widespread but nowhere very abundant. Jashpur, up to 3,200 feet.

21. ***Polygala persicariaefolia** DC. On steep grassy slope of Jamunia Pāt, 3,500 feet, Jashpur. Several plants were seen here but it was not recorded elsewhere.

22. ***Polygala triphylla** Ham. Under shade in mixed forest at 3,200 feet above Kardhana, Jashpur.

23. **Salomonina oblongifolia** DC. Jashpur near Dumar-kona, 3,000 feet, on rather rocky ground in valley.

Aizoaceae.

24. **Mollugo stricta** Linn. Frequent at Netarhat (Haines).

Hypericaceae.

25. ***Hypericum Gaitii** Haines. An endemic. The plant was discovered by Haines at Netarhat and named by him. It is very abundant on the Mainpāt between 3,400–3,700 feet and occurs on Samri Pāt, but not so abundantly. It is not by any means common in Khudia in Jashpur State, where the levels are on the whole lower than in Surguja. I have also collected this plant on the summit of Malyagiri Hill (3,896 ft.) in Pal Lahara State, Orissa. These are the only records of its occurrence.

26. ***Hypericum japonicum** Thunb. Abundant along streams, usually very close to the water's edge. Jashpur and Surguja up to 3,700 feet. Not common below 3,000 feet; rare below 2,500 feet.

Dipterocarpaceae.

27. **Shorea robusta** Gaertn. The commonest tree of the area. Occurs at all elevations and on almost all sites save

* Characteristic of elevations over 3,000 feet.

the hottest up to 4,000 feet on Lahsun Pât, Surguja. Above 3,000 ft. the trees are stunted and rarely exceed 50-feet in height.

Malvaceae.

28. **Bombax malabaricum** DC. Fairly abundant up to 3,800 feet in Surguja; less frequent in Jashpur.

29. **Hibiscus abelmoschus** Linn. Frequent; generally in open sal forest or scrub jungle up to about 3,200 feet in Jashpur. No doubt in other areas also.

30. **Hibiscus cancellatus** Linn. In much the same situations as the foregoing. Also collected in Jashpur.

31. **Hibiscus esculentus** Linn. Cultivated on *baris*.

32. ***Hibiscus pungens** Roxb. Collected at 3,100 feet, above Dumarkona village in Jashpur. Recorded from Pendra valley, Netarhat, by Haines.

33. **Hibiscus Lampas** Cav. Abundant throughout the forests but not seen much above 3,000 feet, although it is very likely to occur.

34. **Kydia calycina** Roxb. Fairly common throughout the area in hill forest.

35. **Sida acuta** Burm. Jashpur, along fringes of the forest, especially near cultivation, 2,500–3,000 feet.

36. **Urena lobata** Linn. Occasional, generally near cultivation or along the fringe of the forest, 2,500–3,000 feet.

37. ***Urena repanda** Roxb. Very frequent on the open plateau lands, 3,000–3,500 feet. Most noticeable in Khudia, Jashpur.

38. **Urena sinuata** Linn. Jashpur, occasional.

Sterculiaceae.

39. **Buettneria herbacea** Roxb. Throughout the hills under slight shade and in the open, generally on stony ground. Up to 3,500 feet in Jashpur.

40. **Eriolaena Hookeriana** W. & A. Observed on Samri Pât, 3,800 feet, where it is locally abundant; also on the Mainpât on high bank above the Laliya *nala*, 3,600 feet.

41. **Helicteres isora** Linn. By no means abundant and certainly not common above 3,000 feet. Occasional on rocky hills 2,500–3,000 feet in Jashpur.

42. **Melochia corchorifolia** Linn. Along borders of ricefields. Collected at Sankiari, 3,000 ft., in Jashpur State.

43. **Sterculia urens** Roxb. 'Neterhat, 3,000 ft.' (Haines). Not observed on the *pâts* in Jashpur or Surguja.

44. **Sterculia villosa** Roxb. Recorded from Netarhat by Haines. Also noted on the Mainpât in Surguja but not anywhere else.

* Characteristic of elevations over 3,000 feet.

Tiliaceae.

45. *Corchorus capsularis* Linn. A weed of cultivated land; Sankiari, 2,600 feet, Jashpur.

46. *Grewia disperma* Rottl. Ravines in Jashpur, 2,500–3,000 feet.

47. *Grewia elastica* Royle. Not uncommon in hill forest in Jashpur, 2,500–3,000 feet. Probably occurs throughout the tract at the higher elevations but was not observed much above 3,000 feet.

48. *Grewia hirsuta* Vahl. Occurs up to about 3,000 feet in open forest but is by no means abundant. Jashpur and southern slopes of the Mainpāt in Surguja.

49. *Grewia tiliæfolia* Vahl. Ascends to Netarhat, 3,000 ft., according to Haines; but it is certainly not common and I have not recorded the tree from Jashpur or Surguja.

50. *Grewia sapida* Roxb. Samri Pāt, 3,800 ft., Surguja, in open grassy scrub jungle. Also seen in Khudia, Jashpur, 3,200 feet. Widespread but nowhere very abundant.

51. *Triumfetta neglecta* W. & A. Under shade in sal forest, 2,500 feet, Jashpur.

52. *Triumfetta pilosa* Roxb. Among grassy jungle near streams or more occasionally on moist banks in forest under light shade, 3,000–3,200 feet, Jashpur.

53. *Triumfetta rhomboidea* Jacq. Jashpur.

Euphorbiaceae.

54. *Antidesma diandrum* Roth. Called 'saroti' in Surguja. Fairly frequent throughout the area but mostly in forests in the valleys.

55. *Bridelia retusa* Spreng. Occasional in hill forests throughout the area but less frequent above 3,000 feet.

56. *Bridelia verrucosa* Haines. Stated by Haines to occur in ravines in the higher hills of Chota Nagpur and is therefore likely to be found in ravines leading up to the pāts. Not actually recorded by me.

57. *Croton oblongifolius* Roxb. Not abundant above 2,500 feet but was observed in both Jashpur and Surguja rarely in valleys up to about 3,000 feet.

58. **Emblica officinalis* Gaertn. Exceedingly abundant on shallow soils on the Mainpāt, Surguja. Less frequent on Samri Pāt and in Jashpur, where conditions appear to be moister. Nevertheless, occasional to frequent throughout the area on the drier and more open sites, especially on laterite.

59. *Euphorbia hirta* Linn. Frequent throughout the area on banks and grassy slopes. A common weed and very common near dwellings.

* Characteristic of elevations over 3,000 feet.

60. *Euphorbia hypericifolia* Linn. var. b. Jashpur, on Jamunia Pāt, 3,500 feet, on a fairly steep grassy northerly slope.

61. **Euphorbia prolifera* Ham. This is one of the most characteristic plants of the *pāts*. It is exceedingly abundant and conspicuous in open grass lands and along the fringes of the forest on plateaux between 3,000 and 4,000 feet. It occurs down to 2,500 feet (Jashpur) but I have not seen it below this. It is abundant in both Jashpur and Suguja and is recorded by Haines from Netarhat. I have not noted it nor can I find any records of this plant further south in Orissa or in the Eastern Ghats, nor have I seen it on the plateau lands of Kawardha State further west in the Central Provinces. The distribution appears to be very local in our area; but the plant is found in the central and western Himalaya.

62. *Flueggea obovata* Baill. Rare; on bank of stream near Kamaleswarpur, 3,600 feet, Mainpāt.

63. *Glochidion lanceolarium* Dalz. Moist sal forest in valleys, usually under some shade, 2,500–3,000 feet.

64. **Glochidion multiloculare* Muell. Arg. On high bank of stream in Laliya valley, 3,600 feet. On Mainpāt, Surguja. Not recorded or observed on other areas.

65. **Glochidion velutinum* Wt. Very abundant on the open plateau of the Mainpāt, 3,400–3,700 feet, in Surguja. Not common elsewhere although the site factors appear similar in many places. This small tree is most characteristic of the laterite plateau of the Mainpāt.

66. *Jatropha curcas* Linn. Occasionally planted in village hedges up to about 3,000 feet but not seen above this altitude. It is very common at lower levels.

67. *Mallotus philippinensis* Muell. Arg. Rare. Collected once on high bank of stream near Laliya, 3,600 feet, Mainpāt, Surguja.

68. *Phyllanthus debilis* Ham. Palamau, ascending to 3,000 feet. (Haines.)

69. *Phyllanthus simplex* Retz. Occasional in open near villages and in scrub jungle up to 3,200 feet in Jashpur; also probably in Surguja.

70. *Phyllanthus urinaria* Linn. Occasional in Jashpur up to 3,500 feet. Not observed in Surguja but probably occurs.

71. *Ricinus communis* Linn. Cultivated on a small scale in *baris* mostly below 3,000 feet and not commonly grown as a field crop. Jashpur and Surguja.

Callitrichaceae.

72. *Callitriche stagnalis* Seep. 'Surguja plateau, 2,000 feet, in still water near stream' (Wood) quoted by Haines.

* Characteristic of elevations over 3,000 feet.

Linaceae.

73. **Reinwardtia trigyna** Planch. Not common. Under shade near bank of stream along Macheri Nala, 3,600 feet, Mainpāt, Surguja.

Malpighiaceae.

74. **Hiptage madablota** Gaertn. Jashpur, rare; also collected near stream among laterite boulders near Laliya 3,600 feet, Mainpāt, Surguja.

Geraniaceae.

75. **Biophytum Reinwardtii** Walp. On moist banks, usually under shade, in all the hills of the area. Most common between 2,500 and 3,000 feet.

76. ***Geranium ocellatum** Camb. Recorded by Haines from Netarhat, 3,300 feet. I have not seen this plant in Jashpur or Surguja although I have collected it on the Kawardha *dādars* at 2,300 feet further west in the C.P.

77. **Oxalis corniculata** Linn. Jashpur and Surguja fairly common in the open and under light shade up to 3,800 feet.

Rutaceae.

78. **Aegle marmelos** Corrae. In spite of its frost-resisting qualities, this is by no means a common tree in this area. It was not seen on any of the *pāts* but occurs very sparingly in dry forest about 2,500 feet, usually on southern aspects. Noted on Marual Hill, Jashpur.

79. **Murraya exotica** Linn. var. **sumatrana** Roxb. Recorded by Haines from ravines below Netarhat. It will no doubt be found in similar localities in Jashpur and Surguja but I did not note it and it is certainly nowhere abundant.

Ochnaceae.

80. ***Ochna pumila** Ham. Surguja and Jashpur up to 3,600 feet. Frequent and conspicuous in May in the open grasslands and scrub jungle. Recorded from Netarhat by Haines.

Burseraceae.

81. **Bursera serrata** Colebr. Occasional or locally frequent throughout all the hill forests; most abundant on the cool sides of hills. Not actually observed above 3,200 feet.

* Characteristic of elevations over 3,000 feet.

Meliaceae.

82. ***Cedrela toona** Roxb. This is one of the most characteristic species of these hill tracts. It is found in sal forest on the plateau lands but perhaps more abundantly on the cool sides of hills and valleys, and especially near streams. At Dumarkona in Jashpur there is a magnificent clump of big *toon* trees exceeding 100 feet in height and 9 feet in girth.

Olacaceae.

83. **Cansjera Rheedii** Roxb. Along bank of stream in shady glen, Gullu, 3,000 feet, Jashpur.

84. **Olax nana** Wall. Recorded by Haines from the Netarhat plateau. Curiously enough, that common rambling shrub **O. scandens** Roxb. has not been recorded. It would be strange if it did not occur.

Celastraceae.

85. **Celastrus paniculata** Willd. Occasional between 2,500–3,000 feet but rare above the latter elevation. Jashpur and Surguja.

86. **Elaeodendron glaucum** Pers. Occasional on the Mainpāt 3,400–3,600 feet. More abundant in sal forest 2,500–3,000 feet.

Rhamnaceae.

87. ***Helinus lanceolatus** Brand. Rather rare in open jungles on the hills of Surguja and Jashpur, mostly 2,500–3,000 feet. Recorded from Netarhat by Haines.

88. ***Rhamnus virgatus** Roxb. Frequent along rocky ravines on laterite, 3,500–3,700 feet, on the Mainpāt, Surguja; but not seen anywhere else. Recorded by Haines from Netarhat.

89. **Zizyphus jujuba** Lamk. (var. **nummularia** Haines). Frequent up to 4,000 feet in fallow land.

90. **Zizyphus rugosa** Lamk. Abundant, especially in sheltered localities on laterite, up to 3,800 feet.

91. **Zizyphus xylopyrus** Willd. Occasional on the Mainpāt but not observed elsewhere.

Ampelidaceae.

92. **Ampelocissus latifolia** Planch. Frequent in undergrowth in mixed forest 2,500–3,000 feet but not so common above this. Rare at the higher elevations.

93. **Ampelocissus tomentosa** Planch. Recorded from Netarhat by Haines. Not noted by me from the other *pāts*,

* Characteristic of elevations over 3,000 feet.

though no doubt it occurs. I doubt if it is at all abundant above 3,000 feet; and it very probably is found in association with the foregoing species in similar forest at the lower altitudes.

94. *Cayratia carnosa* Gagnep. Netarhat (Haines).

95. *Cissus repanda* Vahl. In similar localities to the previous two. It is common in hill forest in the valley of the Ib near Gullu about 2,500 feet but becomes decreasingly abundant above that level.

96. *Leea crispa* Linn. Palamau, grasslands, ascending to the top of the *pāts* (Haines). Also noted in Jashpur up to 3,400 feet in Dhaura Pāt but generally in open forest rather than in grasslands.

97. *Leea aspera* Edgw. The small variety (*L. herbacea* Ham.) is abundant in the forests, more especially on the slopes and in ravines up to 3,600 feet in Surguja and up to 3,400 feet in Jashpur.

Sapindaceae.

98. *Schleichera oleosa* (Lour.) Merr. Although this is undoubtedly a tree of the hills, it is not common above 2,500 feet; and I have no record of it above 3,000 feet in Jashpur or Surguja. It does, however, become increasingly abundant below 2,500 feet.

Sabiaceae.

99. **Meliosma simplicifolia* Walp. Rare. In moist shady places along perennial streams, above 2,500 feet mostly. Surguja and Jashpur.

Anacardiaceae.

100. *Buchanania lanzan* Spreng. Not nearly so common as in the plains. It occurs sparingly up to 3,600 feet in Surguja and Jashpur.

101. *Lannea grandis* Engl. Not very abundant but occurs on the drier sites throughout the area up to 3,000 feet or slightly more.

102. *Mangifera indica* Linn. In cool valleys and ravines in the hills up to 3,600 feet.

103. *Semecarpus anacardium* Linn. Patia, 2,800 feet, and Padli forest, 3,200 feet, in Khudiā, Jashpur. Not common and of small size.

Papilionaceae.

104. *Abrus precatorius* Linn. Occasional throughout the area up to about 3,000 feet or slightly more and becoming increasingly abundant at lower elevations.

* Characteristic of elevations over 3,000 feet.

105. *Aeschynomene indica* Linn. Collected on margin of small rivulet at Sardih, 2,700 feet, Jashpur.

106. *Alysicarpus bupleurifolius* DC. var. *erecta*. Recorded from the *pāts* of Chota Nagpur by Haines. Collected several times in Jashpur up to 3,000 feet. Not recorded from the other plateaux, as they were not visited during the monsoon and early cold weather when the plant is most conspicuous; but no doubt it occurs.

107. *Alysicarpus vaginalis* DC. Also collected several times in Jashpur but ascending higher than the preceding species. Both these plants extend into the plains.

108. *Atylosia scarabaeoides* Benth. Frequent in open sal jungle and waste land up to 3,500 feet at least in Jashpur and Surguja.

109. *Butea frondosa* Roxb. Rare, but occurs up to 3,800 feet in Surguja on Samri Pāt and the Mainpāt.

110. *Butea parviflora* Roxb. In valley forests throughout the area but not very common; and not abundant above 3,000 feet.

111. *Butea superba* Roxb. Throughout, but nowhere common. Generally on the drier sites and in dry mixed forest; often on basic rocks.

112. *Cajanus indicus* Spreng. Cultivated everywhere up to the summits of the *pāts*. This is commonly the first crop sown in clearings for shifting cultivation under the name of *kandul*.

113. *Crotalaria acicularis* Ham. Jashpur. Frequent on grassy banks and in the open up to 3,200 feet. It will, no doubt, be found on all the *pāts*.

114. *Crotalaria albida* Heyne. Very abundant in forest and scrub jungle up to 3,500 feet throughout the area.

115. *Crotalaria alata* Ham. Abundant, both in the open and under moderate shade in Jashpur and Surguja, ascending to 3,500 feet and probably more.

116. *Crotalaria calycina* Schrank. Occasional about 2,500 feet but not abundant at higher altitudes. Jashpur and Surguja.

117. *Crotalaria ferruginea* Grah. Chota Nagpur, 2,000–3,000 feet (Haines). Abundant in sal forest throughout Jashpur and Surguja up to 3,300 feet at least.

118. *Crotalaria juncea* Linn. Cultivated for its fibre. Fairly common throughout the area up to about 3,000 feet; but not actually seen on the summits of the *pāts*.

119. *Crotalaria medicaginea* Lamk. var. *herniaroides*. Very abundant throughout the *pāts*, especially along valleys and streams. Collected in Jashpur at Dumarkona.

120. *Crotalaria medicaginea* Lamk. var. *neglecta*. Fairly frequent in sal forest especially on dry banks. Jashpur 3,000 feet.

121. *Crotalaria mysorensis* Roth. Jashpur in open forest up to 3,300 feet, abundant. No doubt on all the *pāts* up to 3,800 feet.

122. **Crotalaria prostrata* Roxb. var. *levis*. Jashpur, 3,000 feet, in the open. Netarhat, 3,000 ft. (Haines).

123. *Crotalaria sericea* Retz. Mostly in valleys. Occasional or frequent in grass near streams 2,500–3,000 feet, throughout the area. A conspicuous species with a wide distribution.

124. *Dalbergia latifolia* Roxb. Very rare in mixed, forest in the hills and only attaining a small size. Jashpur, in hills above valley of Ib, 2,500 feet. Not observed anywhere on the *pāts* or above 3,000 feet.

125. *Desmodium brachystachyum* DC. Jashpur, 3,100 feet. Frequent in open scrub jungle.

126. *Desmodium cephalotes* Wall. Surguja; but locality not noted.

127. *Desmodium gangeticum* DC. Jashpur, 3,300 feet. Frequent both under light shade in the forest and along grassy banks of streams.

128. *Desmodium gyrans* DC. Abundant everywhere in sal forest up to 3,600 feet.

129. **Desmodium gyroides* DC. Banks of streams, mostly over 2,800 feet. Fairly abundant in Jashpur; not observed in Surguja. Recorded from Netarhat by Haines.

130. *Desmodium heterocarpum* DC. (*D. polycarpum* DC.) Jashpur, 3,100 feet at Dumarkona and elsewhere. Common throughout the area in forest and open scrub jungle, especially in somewhat moist localities. Ascends to at least 3,500 feet.

131. *Desmodium latifolium* DC. Jashpur, 3,100 feet. In forest under shade.

132. *Desmodium laxifolium* DC. Jashpur, 3,000 feet, near Dumarkona.

133. *Desmodium triflorum* DC. Very abundant on grassy banks and in meadows throughout the area, ascending to 3,300 feet at least.

134. *Desmodium triquetrum* DC. Jashpur, in sal forest. Not generally found much above 2,500 feet.

135. *Dolichos lablab* Linn. Cultivated on trellises throughout the tract up to 3,600 feet in Jashpur and Surguja.

136. **Dumasia villosa* DC. Ravines near Netarhat, elev. 3,000 ft. (Haines).

137. *Eriosema chinense* Vogl. Dumarkona 3,000 feet in open scrub jungle and elsewhere in open dry forests, occasional. 'Chota Nagpur, ascending to 3,000 feet' (Haines).

138. **Erythrina resupinata* Roxb. Surguja, occasional in grassland over 2,500 feet. Netarhat (Haines).

* Characteristic of elevations over 3,000 feet.

139. *Erythrina suberosa* Roxb. In dry mixed forest, generally on southern aspects, up to 2,500 feet, in hill forest. Surguja on slopes of the Mainpāt, and in Jashpur in the rocky hills above the Ib valley and on Marual Hill. Not observed on the summits of the *pāts*.

140. *Flemingia bracteata* Wight. Surguja. The exact locality has not been noted but it was probably collected along the edge of the forest or in a glade between 2,500 and 3,000 feet.

141. *Flemingia chappar* Ham. Jashpur. Ascends with the sal to slightly above 2,500 feet but is not abundant above this and disappears entirely at the highest levels. Seen under shade on hill slopes in Jashpur but not in Surguja.

142. *Flemingia stricta* Roxb. Jashpur, under shade in hill forest; often sub-gregarious. Not common above 2,500 feet.

143. *Flemingia strobilifera* R. Br. Netarhat (Haines). Not noted by me from Surguja or Jashpur.

144. *Indigofera Hamiltonii* Grah. Frequent at high levels in scrub jungle in Surguja and recorded from the plateaux of Chota Nagpur by Haines.

145. *Indigofera hirsuta* Linn. Jashpur. Wet grassy bank near stream, Kapsel 2,400 feet.

146. *Indigofera linifolia* Retz. Jashpur. Open dry pasture near Dumarkona, 3,100 feet.

147. *Indigofera pulchella* Roxb. Not so common on the plateaux but abundant on the slopes, especially between 2,500 and 3,000 feet.

148. *Indigofera trifoliata* Linn. Jashpur. Locally abundant on open grassy banks or in glades in the forest. Chaulia Pāt, 3,500 feet.

149. **Lespedeza sericea* Miq. Locally frequent in the Jashpur hills, generally above 3,000 feet in thin forest or, more commonly, in open scrub jungle among grass. It is a characteristic plant of these highlands. Not observed in Surguja but this may be due to the fact that the Surguja hills were not examined during the monsoon months and early cold weather. Recorded from Netarhat by Haines.

150. *Millettia auriculata* Baker. In sal forest throughout the area up to at least 3,500 feet.

151. *Millettia racemosa* Benth. In rocky ravines leading up to the Mainpāt 2,500–3,500 feet; and will no doubt be found in similar localities elsewhere in the area. Not so abundant as *M. auriculata*.

152. *Mucuna imbricata* DC. In damp shady ravine above Gullu, 3,000 feet, in Jashpur. Not observed elsewhere.

153. *Ougeinia dalbergioides* Benth. Frequent in all hill forests up to about 3,500 feet.

* Characteristic of elevations over 3,000 feet.

154. **Phaseolus calcaratus** Roxb. Frequent in sal forest up to 3,500 feet. Collected on Jamunia Pāt, Jashpur; but it will most probably be found at even higher altitudes.

155. **Phaseolus mungo** Linn. var. **Roxburghii**. In cultivation up to 3,000 feet.

156. **Pterocarpus marsupium** Roxb. Not at all common. Occurs occasionally in hill forest; but a survey which covered most of the forests in Khudia, Jashpur, recorded few trees and none over 16 inches in diameter. Has been noted at 3,000 feet but not above that elevation.

157. **Sesbania aegyptica** Pers. Jashpur. Usually near homesteads in fallow lands and cultivation but not observed above 2,500–3,000 feet.

158. ***Shuteria densifolia** Benth. This slender climber has been recorded by Haines from Ranchi and Palamau in valleys at about 3,000 feet and may therefore be included, as the hills referred to are probably at or near Netarhat.

159. **Smithia conferta** Sm. Locally abundant in wet grassland and along edges of ricefields up to 3,500 feet. Collected in Jashpur but will surely be found on the other plateaux.

160. **Sophora Bakeri** Clarke. Recorded from the *pāts* of Ranchi and Palamau by Haines.

161. **Tephrosia purpurea** Pers. Jashpur, on dry sandy soil derived from disintegrating granite in exposed hot situation. Kardhana, 3,100 feet, Jashpur.

162. ***Tephrosia tinctoria** Pers. Netarhat plateau, Seemah forest, elev. 3,000 feet (Haines). Frequent along Macheri valley, 3,600 feet, on laterite in dry situations, Mainpāt, Surguja.

163. **Uraria alopecuroides** Wight. Jashpur, in open sal forest at 3,000 feet.

164. **Uraria lagopodioides** Merr. In grassy glade in sal forest, Jashpur, 2,500 feet.

165. **Uraria picta** Desv. Edge of forest, 2,500 feet, Jashpur.

166. **Vigna vexillata** Benth. Jashpur, 3,100 feet; in sal forest near Kardhana.

167. **Zornia diphylla** Pers. Abundant in grasslands on the *pāts*, more especially near water. Jashpur, 2,500–3,300 feet. Will almost certainly be found up to 4,000 feet.

Caesalpinaceae.

168. ***Bauhinia retusa** Ham. Very abundant in sal forest, especially on the slopes; Jashpur and Surguja. Frequent at Chapi and Sarangjobi on Samri Pāt. Not observed on the Mainpāt.

169. **Bauhinia Vahlia** W. & A. Abundant in all forests up to 3,800 feet.

* Characteristic of elevations over 3,000 feet.

170. **Bauhinia variegata** Linn. Much planted in villages, especially in Khudia, Jashpur. Occasional in the forest up to 3,200 feet at least.

171. **Cassia absus** Linn. Not abundant but occasionally locally gregarious as at Kardhana, 3,100 feet, on granite, Jashpur.

172. **Cassia Leschenaultiana** DC. Very abundant, especially in moist grassy glades or on the lower slopes of valleys near streams. Netarhat (Haines).

173. **Cassia occidentalis** Linn. Throughout the plateau lands near habitations up to 3,500 feet.

174. **Cassia tora** Linn. Not common but sometimes occurring along the edge of the forest in the vicinity of cultivation, as above Kardhana at 3,200 feet in Jashpur.

Mimosaceae.

175. **Acacia lenticularis** Ham. Fairly abundant throughout the area, perhaps most common on the Surguja *pāts*, 3,500-3,800 feet. Recorded by Haines from Netarhat.

176. **Acacia torta** Craib. Occasional; rather more frequent in dry rocky ravines in Surguja, up to 3,500 feet.

177. **Entada scandens** Benth. Both rare and very local; along shady, rocky ravines in Jashpur about 3,000 feet. Not noted in Surguja.

Rosaceae.

178. ***Crataegus crenulata** Roxb. This plant was discovered on the bank of a stream between 3,700 and 3,800 feet, just below the crest of the Samri Pāt near Nawadih village. This is an interesting find, as the plant is Himalayan and has not hitherto been recorded from the Peninsula. It was not noted anywhere else in the area.

179. ***Fragaria indica** Anders. Collected twice (on different occasions) from moist bank close to stream near Kamaleswarpur, 3,600 feet, on the Mainpāt, Surguja. Not seen elsewhere.

180. ***Potentilla Kleiniana** W. & A. Surguja. Banks of streams on Samri Pāt, 3,700-3,800 feet. Not seen on the Mainpāt although similar conditions prevail. The altitude of the Mainpāt is, however, very slightly lower. Recorded by Haines from Netarhat, which is not far from Samri Pāt.

181. ***Potentilla Leschenaultiana** Ser. Collected in similar situations and often found in association with the foregoing on Samri Pāt. Recorded from Netarhat by Haines. Neither this plant nor **P. Kleiniana** was observed on any of the Jashpur hills, which nowhere exceed 3,600 feet and are generally 3,200-3,400 feet.

* Characteristic of elevations over 3,000 feet.

182. ***Pygeum Andersoni** Hook. f. Three specimens of this small and very rare tree were found growing among laterite rocks at the head of the waterfall in the Nawadih valley about 3,600 feet below Samri Pāt. One tree was also found at the head of the Asgawan valley on the Mainpāt about 3,400 feet, Surguja.

183. ***Pyrus Pashia** Ham. This interesting and, in these parts, extremely rare tree occurs along the Laliya Nala and along the stream near Kamaleswarpur on the Mainpāt in Surguja at an elevation of about 3,600 feet. In the first valley only three trees were seen but several were observed along the Kamaleswarpur valley growing in association with willows but rooting very slightly further from the water's edge. When first discovered in the month of May the trees were fruiting heavily. This **Pyrus** was not observed elsewhere on the *pāts* and forms, together with **Crataegus crenulata** and **Euphorbia prolifera**, an interesting trio of Himalayan species in Surguja. This is the first time **P. Pashia** has been recorded from the Peninsula.

184. ***Rubus ellipticus** Sm. A few bushes occur along the Macheri *nala* on the Mainpāt at about 3,600 feet. Not observed elsewhere.

185. **Rubus molluccanus** Linn. (**R. rugosus** Sm.) Frequent along the Macheri *nala* and in the Laliya valley, 3,400–3,600 feet, on the Mainpāt and also collected on Samri Pāt at 3,700 feet. It occurs along the banks of streams close to water but not rooting in it. Recorded by Haines from the Pendra valley below Netarhat.

Droseraceae.

186. **Drosera Burmanni** Vahl. Not abundant and very local. In moist ground near Dumarkona, 3,000 ft., in Jashpur. This little plant will most probably be found at higher elevations wherever favourable conditions exist.

187. **Drosera indica** Linn. In moist swampy ground near spring above Dumarkona, 3,100 feet, Jashpur. It will certainly be found elsewhere and at higher levels.

Combretaceae.

188. **Combretum nanum** Ham. Occasional but sometimes locally abundant on the *pāts* and conspicuous after the grass has been burnt. Jashpur and Surguja, up to 3,600 feet.

189. **Terminalia belerica** Roxb. Moderately frequent throughout the area up to 3,000 feet but not common above that altitude.

190. ***Terminalia chebula** Retz. Exceedingly abundant on some of the plateaux, especially on the Mainpāt; and on Samri Pāt up to 4,000 feet.

* Characteristic of elevations over 3,000 feet.

191. ***Terminalia tomentosa*** W. & A. Exceedingly rare, if not altogether absent above 3,500 feet; but it occurs on the slopes with increasing frequency below 3,000 feet. The scarcity of this otherwise common species and its common associate, ***Anogeissus latifolia*** Wall., is striking. It was not observed, although looked for, on either the Mainpāt or Samri Pāt.

Myrtaceae.

192. ***Eugenia glaucissima*** Haines. Very abundant on the Mainpāt, 3,400–3,700 feet, Surguja.

193. ***Syzygium Jambolanum*** DC. Rather frequent near streams, generally in the open; also occurring on the plateaux up to 3,700 feet in Jashpur and Surguja.

Lecythidaceae.

194. ***Careya arborea*** Roxb. Occasional in sal forests, up to 3,500 feet, Surguja.

Melastomaceae.

195. ***Melastoma malabathricum*** Linn. Along streams in Jashpur but not seen above 3,000 feet and rarely above 2,500 feet. Not observed on the Jashpur and Surguja plateaux.

196. ***Osbeckia chinensis*** Linn. Jashpur in moist grass-land near bank of stream, 3,100 feet.

197. ****Osbeckia rostrata*** Den. var. ***sexangulata*** Haines. Recorded by Haines from Netarhat and collected by me along streams on the Mainpāt and also in Jashpur, 3,000–3,600 feet.

198. ***Sonerilla tenera*** Royle. Frequent and often locally abundant on moist banks under moderate or heavy shade in the forest at all elevations, Jashpur. No doubt it will also be found in Surguja.

Lythraceae.

199. ***Ammania rotundifolia*** Ham. Abundant along streams at all elevations.

200. ***Ammania pentandra*** Roxb. In ricefields at Dumarkona; 3,000 ft., Jashpur. Probably throughout the area in ricefields, which are not commonly met with much above 3,200 feet.

201. ***Ammania baccifera*** Linn. In similar situations to the foregoing. The ricefields on the Mainpāt and Samri Pāt at about 3,600 feet were not seen during the cold weather; so it cannot be stated definitely if this plant ascends to this elevation. However, it seems probable.

* Characteristic of elevations over 3,000 feet.

202. **Lagerstroemia parviflora** Roxb. I find that I have only recorded this tree from the Mainpāt, 3,600 feet, in Surguja; but I think it will be found on all the plateau lands.

203. **Woodfordia fruticosa** (Linn.) Kurz. Up to 3,800 feet in Surguja. More abundant on Samri Pāt than on the Mainpāt.

Cucurbitaceae.

204. **Cucurbita maxima** Duchesne. The gourd is widely cultivated throughout the area at all elevations and is commonly grown on the thatched roofs of houses.

205. **Cucurbita pepo** DC. The pumpkin is cultivated throughout the area at all levels.

206. **Curcumis sativus** Linn. Cultivated up to at least 3,400 feet in Surguja and Jashpur.

207. **Gymnopetalum cochinchinense** Kurz. 'Ranchi and Singhbhum on the ghats and plateau' (Haines). Therefore, no doubt, at Netarhat and in Jashpur.

208. **Luffa acutangula** Roxb. Cultivated on the *pāts*.

209. **Melothria heterophylla** Cogn. Jashpur, in grassy scrub jungle in valley, 3,200 feet.

210. **Momordia charantia** Linn. A common weed of hedges and trellises close to villages. On the *pāts* of Jashpur and Surguja up to 3,500 feet.

211. **Mukia maderaspatana** Kurz. Collected in Jashpur in waste land slightly below 2,500 feet; but it is certain to be found at higher elevations up to at least 3,000 feet, although not actually recorded.

212. **Trichosanthes palmata** Roxb. Recorded by Haines from the plateaux of Ranchi and Palamau.

Begoniaceae.

213. **Begonia picta** Sm. Common and usually gregarious on moist banks under shade and hence not abundant on the *pāts*, although frequent in the glens and ravines leading up to them. Jashpur on slopes of Jamunia Pāt, 3,300 feet.

Umbelliferae (11).

214. ***Bupleurum falcatum** Linn. Netarhat (Haines).

215. ***Bupleurum mucronatum** W. & A. Recorded from Netarhat by Haines. Frequent on the Khudia plateau, Jashpur, above 3,000 feet. Generally on banks of streams or under slight shade in the forest. Along streams on the Mainpāt in Surguja but the specimens were immature and the identification therefore doubtful.

* Characteristic of elevations over 3,000 feet.

216. **Hydrocotyle asiatica** Linn. Very abundant along streams in Jashpur and Surguja up to 3,900 feet.

217. ***Hydrocotyle rotundifolia** Roxb. Usually found in association with the foregoing but is, perhaps, more of a high-level plant than *H. asiatica*.

218. ***Ligusticum alboalatum** Haines. First recorded by Haines from Netarhat. Collected twice by me among rocks in the valley below Nawadih village, Samri Pât, 3,600 feet. As these are the only two records, the plant has the appearance of being endemic and of rare occurrence in the area.

219. ***Oenanthe stolonifera** Roth. Netarhat (Haines). It is common along the edge of streams and in swampy ground on the Mainpât, especially in the vicinity of Kamaleswarpur, but I cannot say that I have observed it elsewhere.

220. ***Peucedanum dhana** Ham. On clay banks along the Ib river near Sanna, 2,700 feet, Jashpur. Recorded by Haines from the high plateau lands of Chota Nagpur.

221. **Peucedanum nagpurens** Prain. Collected in Jashpur at 3,000 feet. Netarhat (Haines).

222. ***Pimpinella bracteata** Haines. Netarhat and higher hills of Chota Nagpur (Haines). It occurs in Jashpur occasionally above 2,500 feet.

223. **Pimpinella monoica** Dalz. Netarhat (Haines).

224. ***Pycnocycla glauca** Lindl. Netarhat (Haines). This plant must be rare; for, although I have searched for it, I did not find a specimen.

Araliaceae.

225. **Heteropanax fragrans** Seem. var. **serrata** Haines. 'Near streams in the mountains, southern range, Palamau' (Haines). The mountains referred to are those ranges leading up to or spurs projecting from the Netarhat plateau; elevation 2,500-3,500 feet.

226. **Schefflera Roxburghii** Gamble. Abundant in rocky ravines and epiphytic on trees up to 3,600 feet in Jashpur and Surguja. It appears to be partial to laterite.

Rubiaceae (20).

227. **Argostemma verticillatum** Wall. Jashpur, on moist bank under shade.

228. **Borreria stricta** K. Sch. A fairly common weed, especially abundant near cultivation, on waste land and along the fringe of the forest. It occurs mostly below 3,000 feet and is not generally abundant above that elevation.

229. **Borreria hispida** K. Sch. Abundant at all elevations in the open on dry soils.

* Characteristic of elevations over 3,000 feet.

230. *Canthium didymum* Roxb. In dry, rocky ravines in Surguja. Also probably in other areas in similar situations but not recorded.

231. *Gardenia turgida* Roxb. Jashpur, in open sal forest about 2,500 feet. None of the three common gardenias of these parts, *G. latifolia*, *G. gummifera* and *G. turgida*, were observed above 3,000 feet.

232. *Hedyotis pinifolia* Hook f. In swamp at Sarangjibi, 3,500 feet, on Samri Pât, Surguja.

233. *Hymenodictyon excelsum* Wall. Not observed on any of the *pâts* themselves or on their slopes but noted on Marual Hill over 2,500 feet, not far south of the Khudia plateau in Jashpur and therefore likely to occur on the slopes of the latter in suitable localities.

234. *Knoxia corymbosa* Willd. Occasional throughout the area; not perhaps at the highest elevations above 3,200 feet.

235. **Knoxia bracycarpa* Bl. Collected once at Sankiari, 2,600 feet, in Jashpur on high grassy bank above Ib river, where several specimens were seen. Not observed elsewhere in the area. The plant is recorded from Parasnath (C. B. Clarke) by Haines; the only other record from Bihar and Orissa.

236. *Oldenlandia corymbosa* Linn. Jashpur, in open grassland.

237. *Oldenlandia dichotoma* Koen. Jashpur, frequent on banks, especially on cuttings along roadsides. Seen mostly between 2,500 and 3,000 feet. Noted from Netarhat by Haines.

238. **Oldenlandia gracilis* DC. *Pâts* of Chota Nagpur (Haines). Noted on Mainpât in open grassland near stream, 3,600 feet; also in Jashpur. I do not think it is so common on the *pâts* as it is on the hills of south Kalahandi.

239. *Oldenlandia hispida* Benth. Surguja in swamp at Sarangjibi, 3,500 feet on Samri Pât; also in Jashpur.

240. *Oldenlandia nudicaulis* Roth. Jashpur. The locality has not been noted.

241. **Ophiorrhiza fasciculata* Don. Netarhat (Haines).

242. *Pavetta indica* Linn. Frequent, especially in second growth scrub jungle on slopes. Surguja and Jashpur, 2,500 to 3,500 feet.

243. *Randia dumetorum* Lamk. Abundant in sal forest on the plateaux and on their slopes up to 3,800 feet.

244. *Rubia cordifolia* Linn. Recorded from Netarhat by Haines. I did not observe it on any of the other plateaux, although I have collected it several times in the hills of southern Orissa in Kalahandi State.

245. *Vangueria pubescens* Kurz. Mainpât in Surguja at Kamaleswarpur, 3,600 feet. Frequent throughout the area. Some very large specimens on the Mainpât.

* Characteristic of elevations over 3,000 feet.

246. **Wendlandia tinctoria** DC. Seen at 2,500 feet in Jashpur but not noted above this elevation; so, even if it occurs, it is rare.

Compositae.

247. **Acanthospermum hispidum** DC. A recent invader. Locally gregarious on waste land at Kamaleswarpur, 3,600 feet, on the Mainpāt in Surguja, where it is said to have arrived about four years ago. This is the first record of this plant in the area covered by Haines' *Botany of Bihar and Orissa*.

248. ***Adenostemma viscosum** Forst. var. **typica**. Swampy ground, 3,100 feet, at Dumarkona in Jashpur. 'Valleys at higher elevations, Chota Nagpur.' (Haines.)

249. **Ageratum conyzoides** Linn. Throughout the area in various localities but commonest in the vicinity of cultivation. Up to 3,800 feet in Surguja.

250. ***Artemesia parviflora** Roxb. Very characteristic and abundant on the *pāts*, 3,000–3,800 feet, mostly on grassy banks or in open scrub jungle. Collected several times in Jashpur, Surguja, frequent on banks of streams and occasional in glades. Netarhat (Haines).

251. **Bidens pilosa** Linn. Chota Nagpur at higher elevations (Haines). Frequent in Jashpur near streams on the plateaux and close to cultivation. Generally a common weed.

252. **Blainvillea rhomboidea** Cass. In cultivated uplands, 3,400 feet, in Jashpur above Dumarkona.

253. **Blumea flava** DC. Frequent in grassy glades and thin sal forest in Jashpur, up to 3,000 feet. Not so abundant above this level. No doubt it occurs in Surguja also.

254. **Blumea Hamiltonii** DC. Netarhat (Haines).

255. **Blumea Jacquemontii** Hook. Netarhat (Haines).

256. **Blumea lacinata** DC. Netarhat (Haines).

257. **Blumea Wightiana** DC. Common at Netarhat (Haines). It therefore almost certainly occurs on the other *pāts*, although I have not noted it.

258. **Caesulia axillaris** Roxb. In ricefields at 3,000 feet in Jashpur but not seen above this (possibly because there are hardly any ricefields above this elevation). It probably occurs on all the *pāts* wherever conditions are suitable but has not been recorded as they were not visited during the early cold weather.

259. **Chrysanthellum indicum** DC. Very abundant. in the open on heavily grazed ground up to 3,200 feet. Collected in Jashpur but no doubt occurs all over the tract.

260. ***Conyza aegyptica** Ait. Grassy plateaux of Chota Nagpur, 3,000 feet (Haines).

* Characteristic of elevations over 3,000 feet.

261. *Conyza ambigua* DC. Hills of Chota Nagpur, 2,500 feet (Haines). Collected in Jashpur at 3,000 feet not far from Jashpurnagar.

262. **Conyza japonica* Less. Collected in pasture near stream at Sankiari, 2,600 feet, Jashpur. 'Grassy plateaux of Chota Nagpur; Netarhat.' (Haines.)

• 263. **Conyza stricta* Willd. This is very characteristic of hills over 2,500 feet throughout the province, being widespread and frequent in open grasslands and scrub jungle above 3,000 feet. Collected in Surguja and Jashpur and recorded from Netarhat by Haines.

264. *Conyza viscidula* Wall. Collected in Laliya valley on the Mainpāt, 3,600 feet, Surguja. Recorded from Netarhat by Haines.

265. *Cosmos sulphureus* Cav. This plant has run wild at Netarhat.

266. *Cyathocline lyrata* Cass. On rocks in streams. Frequent up to 3,700 feet in Jashpur and Surguja.

267. *Elephantopus scaber* Linn. Frequent up to 3,900 feet in Jashpur and Surguja. Generally found on clay soil and more abundant under some shade.

268. *Emilia sonchifolia* Roxb. Frequent throughout the area at all levels and in almost all situations.

269. **Glossogyne pinnatifida* DC. Plateaux of Chota Nagpur (Haines). Not common on the *pāts* in Khudia, Jashpur; and also most probably in Surguja.

270. *Guizotia abyssynica* Cass. Cultivated throughout the area and on the *pāts* up to 3,800 feet.

271. *Laggeta alata* Schult-Bip. Netarhat (Haines).

272. **Pulicaria angustifolia* DC. Jashpur, 2,500–3,000 feet, frequent; no doubt it ascends higher but was not observed. Recorded from Netarhat by Haines.

273. *Senecio nudicaulis* Ham. Common throughout the area above 3,000 feet. It is exceedingly abundant in heavily grazed pasture on the higher parts of the Mainpāt, 3,600–3,800 feet. This is one of the most typical plants of the open grasslands on the *pāts*.

274. *Siegesbeckia orientalis* Linn. Near stream among low bushes 2,800 feet, Jashpur. Apparently nowhere abundant.

275. **Sonchus arvensis* Linn. Occasional, generally on banks near streams. Surguja 3,500–3,600 feet; near Sanna, 3,000 feet, in Jashpur. Netarhat (Haines).

276. **Spilanthes acmella* Linn. var. *calva*. Collected once only in moist grassland not far from a stream at Dumarkona, 3,000 feet, in Jashpur where it was locally abundant over a few acres. I expect it would also be found near the swamp at Sarangjobi in Surguja if visited in October. Netarhat (Haines).

* Characteristic of elevations over 3,000 feet.

277. **Tricholepis stictophyllum* Clarke. Occasional in grasslands 3,000–3,600 feet, Surguja. Netarhat (Haines).

278. *Tridax procumbens* Linn. Jashpur and Surguja; abundant on the *pāts*.

279. *Vernonia anthelmintica* Willd. A depauperated specimen was collected under shade in sal forest on Jamunia Pāt, 3,500 feet, Jashpur.

280. *Vernonia cinerea* Less. Jashpur and Surguja; very abundant in open grassland and in light jungle up to 4,000 feet.

281. *Vernonia divergens* Benth. Recorded at Netarhat by Haines.

282. *Vernonia Roxburghii* Less. Chiefly along the edge of sal forest 2,500–2,800 feet and under light shade in the forest. Collected in Jashpur but will probably be found elsewhere about the same elevation. Does not seem to reach the summits of the *pāts*.

283. *Vernonia teres* Wall. In sal forest under moderate or light shade, 2,500 feet. Not abundant, even if it occurs at all, at higher altitudes.

284. *Vicoa indica* DC. Frequent throughout the area in open forest and scrub jungle. Ascends to 4,000 feet.

285. **Youngia acaulis* DC. Frequent in grasslands on the *pāts* up to 3,000 feet in Surguja. Recorded from the plateaux of Chota Nagpur by Haines.

286. **Youngia japonica* (L.) DC. 'Ascending to the tops of the *pāts*, Ranchi.' (Haines.)

Campanulaceae.

287. *Campanula canescens* Wall. Haines states that this herb occurs on the plateau lands in the Central Provinces and that it will probably be found on the *pāts* of Chota Nagpur.

288. **Cephalostigma Schimper* Hochst. Jashpur 3,000 feet in meadow at Sankiari. 'Frequent at Netarhat.' (Haines.)

289. *Lobelia trialata* Ham. Surguja (Clarke) recorded by Haines.

290. *Lobelia trigona* Roxb. Surguja (Wood) recorded by Haines. Not uncommon in moist grassy places bordering the forest. Jashpur up to 3,000 feet.

291. **Lobelia zeylanica* Linn. var. *aligera* Haines. *Pāts* of Chota Nagpur near streams (Haines).

292. *Wahlenbergia gracilis* DC. Edge of stream, Kamaleswarpur, 3,600 feet, on the Mainpāt, Surguja.

Primulaceae.

293. **Lysimachia obovata* J.D.H. Locally frequent in grasslands along streams in the open. Collected several times

* Characteristic of elevations over 3,000 feet.

on Samri Pāt about 3,600 feet; also along Macheri and other *nalas* on the Mainpāt about the same elevation.

Myrsinaceae.

294. **Ardisia solanacea** Roxb. Collected in both Surguja and Jashpur, mostly in shady depressions and along streams. More abundant in Jashpur than in Surguja.

Ebenaceae.

295. **Diospyros melanoxyton** Roxb. Rather scarce. Surguja mostly below 3,500 feet.

296. **Diospyros montana** Roxb. Surguja; occasional on cool sides of hills. Will also certainly be found in similar situations in Jashpur.

Styraceae.

297. **Symplocos racemosa** Roxb. Occasional. Surguja, on the Mainpāt; fairly frequent along the Macheri valley, 3,500–3,700 feet. No doubt it occurs elsewhere but was not noted.

Oleaceae.

298. **Linociera intermedia** Wight. Netarhat (Haines).

299. ***Jasminum strictum** Haines. Apparently an endemic. Discovered by Haines at Netarhat. Collected by me twice in Surguja; from bank of stream below Nawadih, 3,700 feet, Samri Pāt, and along the Macheri Nala, 3,600 feet, on the Mainpāt, where several specimens were seen.

Apocynaceae.

300. **Carissa opaca** Stapf. Rather local and not at all abundant. Tends to grow on granite in Samri but was also seen several times on laterite on the Mainpāt, 3,600–3,700 feet, Surguja. Not observed in Jashpur and not recorded by Haines from Netarhat.

Asclepiadaceae.

301. **Marsdenia Hamiltonii** Wight. Noted from Netarhat by Haines.

Loganiaceae.

302. ***Buddleia asiatica** Lour. Along banks of streams on Mainpāt, Surguja, at 3,500–3,600 feet. Recorded by Haines from Netarhat.

* Characteristic of elevations over 3,000 feet.

303. **Mitreola oldenlandioides** Wall. Jashpur. . Collected below 2,000 feet in forest under shade but probably ascends much higher, at least to 2,700 feet.

Gentianaceae.

304. **Canscora diffusa** Br. On rocks in streams and on moist banks, 2,500–3,000 feet.

305. **Exacum petiolare** Griseb. Jashpur, occasional on moist banks, 2,500–3,000 feet.

306. **Exacum tetragonum** Roxb. In grassy glades and above all in moist pasture near streams. Frequent up to 3,000 feet in such situations but not so abundant at higher altitudes.

307. **Swertia angustifolia** Ham. var. **pyramidalis** Haines. Occasional in forest glades and grassy valley slopes in Jashpur up to 3,400 feet. Recorded from Netarhat by Haines.

Boraginaceae.

308. ***Cynoglossum denticulatum** A.DC. var. **zeylanica**. Widespread but nowhere very abundant in the hill forests of Surguja and Jashpur. More common than the next and more a forest species, although also occurring near streams.

309. ***Cynoglossum lanceolatum** Forsk. Collected along streams on Samri Pāt, 3,600–3,800 feet, but scarce elsewhere.

310. ***Ehretia acuminata** R.Br. Frequent along water-courses on the Mainpāt, 3,500–3,600 feet, Surguja.

311. **Trichodesma indicum** R.Br. On Mainpāt at 3,700 feet, Surguja, Netarhat (Haines).

Convolvulaceae.

312. **Erycibe paniculata** Roxb. Rare. Mostly in rocky ravines, Surguja.

313. **Evolvulus alsinoides** Linn. Frequent in open situations throughout the area at all elevations.

314. **Evolvulus nummularis** Linn. Jashpur, 2,600 feet, in heavily grazed pasture in valley.

315. ***Ipomoea barlerioides** Benth. Pāts of Ranchi and Palamau (Haines).

316. **Ipomoea chryseides** Ker. Netarhat (Haines).

317. **Ipomoea hispida** Roem. Jashpur. Collected on open grassy hillside, Jamunia Pāt, 3,500 feet. Recorded from Netarhat by Haines.

318. **Ipomoea pes-tigridis** Linn. Jashpur, on river bank.

319. **Lettsomia setosa** Roxb. Netarhat (Haines).

* Characteristic of elevations over 3,000 feet.

Solanaceae.

320. *Solanum nigrum* Linn. Collected once on bank of stream among bushes near Kamaleswarpur, 3,600 feet, Mainpāt.

321. **Solanum torvum* Swartz. Very characteristic of the *pāts*, as it is also of the plateau lands in Kalahandi State, south Orissa. Widespread but nowhere abundant in open forest and wasteland above 3,000 feet. Seen several times in the Jashpur hills, less frequently in the Mainpāt, and not at all on Samri, although it very likely occurs.

Scrophulariaceae (16).

322. **Alectra indica* Benth. Under slight shade along edge of forest, 3,200 feet, Jashpur. Recorded from Palamau, 3,000 feet, by Haines.

323. *Alectra Thompsoni* Hook. f. On moist bank in mixed forest, 1,800 feet, Jashpur. This is just below our level but it will almost certainly extend to slightly higher elevations above 2,500 feet.

324. *Bonnaya brachiata* Link & Otto. Gregarious in patches on moist banks in the forest, especially where the soil is slightly sandy. Also in the open. Noted in abundance near Gullu, 3,000 feet, in Jashpur, but not common above this.

325. *Buchnera hispida* Ham. Very occasional in the forest under slight shade in Jashpur. Netarhat (Haines). Nowhere abundant but widely distributed.

326. *Limnophila gratioloides* Br. Jashpur, but locality not recorded.

327. *Limnophila gratissima* Bl. Jashpur. Swampy ground near Sankiari, 2,500 feet.

328. *Limnophila hypericifolia* Benth. Watercourses below Netarhat (Haines).

329. *Lindenbergia urticaefolia* Lehm. Collected once at Kardhana in Jashpur where it was found growing on a large granite boulder under shade in the bed of a stream at 3,100 feet.

330. **Mazus rugosus* Lour. Surguja 3,700 feet on Samri Pāt in mud near stream. 'Chota Nagpur near rivers on the plateaux.' (Haines.)

331. **Mimulus gracilis* Br. Collected on bank of stream at 3,700 feet below Nawadih village. Samri Pāt, Surguja.

332. *Scoparia dulcis* Linn. Frequent, especially near cultivation, in Surguja and Jashpur up to 3,500 feet.

333. *Sopubia delphinifolia* G. Don. Common in wet grassland and along edges of ricefields up to 3,000 feet, Jashpur. It would probably occur at higher altitudes were the conditions which it requires present but this is not generally the case.

* Characteristic of elevations over 3,000 feet.

334. **Sopubia stricta** G. Don. In similar localities but not so abundant as the foregoing. Jashpur up to 3,000 feet. Netarhat (Haines).

335. **Striga lutea** Lour. Netarhat (Haines). I have also collected this plant at 3,500 feet in Bastar State but not in Jashpur or Surguja. **Striga euphrasioides** Benth. was not observed.

336. **Torenia cordifolia** Roxb. Jashpur, 3,000 feet, in moist locality at Kardhana.

337. **Vandellia stemonoides** Miq. Netarhat (Haines).

Orobanchaceae.

338. **Aeginetia indica** Roxb. Frequent in leaf litter in valleys under shade up to about 3,200 feet. Not observed at higher altitudes.

Lentibulariaceae.

339. **Utricularia coerulea** Linn. Occasional along sandy beds of streams in Jashpur up to 3,000 feet. Will probably be found at higher elevations in Surguja, as the valleys ascend higher. Netarhat (Haines).

340. **Utricularia Wallichiana** Wight. Collected on the Khudia plateau in Jashpur at 3,000 feet in swampy ground. Recorded by Haines from Netarhat.

Gesneraceae.

341. ***Didissandra lanuginosa** Clarke. var. **minuta** Haines. Netarhat (Haines).

342. ***Didymocarpus pygmaea** Clarke. 'Hills of Chota Nagpur 3,000 feet and over' (Haines). Hence probably at Netarhat and on the *pāts* of Jashpur and Surguja.

Bignoniaceae.

343. **Radermachera xylocarpa** K. Schum. Surguja. The locality does not seem to have been noted but it is likely that it was found in dry mixed forest on basic rock about 2,500–3,000 feet.

344. **Stereospermum suaveolens** DC. Occasional in Surguja. Not noted in other areas but it is likely to occur in all hill forests up to 3,000 feet at least.

Acanthaceae (18).

(**Andrographis** spp. Neither **A. echioides** Nees nor **A. paniculata** Nees were observed, which is surprising, as they are both so abundant and widespread at lower altitudes. It is

* Characteristic of elevations over 3,000 feet.

not improbable that they do occur, even though they were not recorded).

345. **Barleria cristata** Linn. Surguja up to 3,800 feet. It will, no doubt, be found on all the *pāts*. **Barleria strigosa** Willd. is common in moist valleys up to about 2,500 feet but does not appear to ascend much above this.

(**Barleria Gibsoni** Dalz. This undershrub was found growing subgregariously in the hills of Khairagarh State some 200 miles to the west of the Mainpāt on basic rock. As in the case of **Strobilanthes callosus**, the edaphic and climatic conditions are very similar to those prevailing on the Mainpāt and it is felt that this plant may possibly occur here. It has been recorded by Haines, who also suggests that it may occur in these hills; but his specimens, like mine, are from the Central Provinces.)

346. **Dicliptera bupleuroides** Nees. Locally abundant in rocky valleys in hills, generally under shade. Up to 3,000 feet in Jashpur.

347. **Dicliptera Roxburghiana** Nees. var. 'Ranchi and Palamau, elev. 3,000 feet.' (Haines.)

(**Eranthemum purpurascens** Nees. Not observed anywhere, which is rather surprising.)

348. **Hemigraphis latebrosa** Nees. Jashpur and Surguja, frequent at all elevations; often abundant on laterite rocks in the forest, seldom under much shade.

349. **Hygrophila angustifolia** R. Br. Collected only once at 3,600 feet under shade of a bank on Samri Pāt, Surguja.

350. **Justicia Betonica** Linn. Jashpur. Occasional in forest in the valleys up to 3,000 feet. Not observed above this altitude.

351. **Justicia diffusa** Willd. Jashpur. Frequent in grassy forest in the open or under shade. Almost certain to occur on the other *pāts*.

352. **Justicia quinquangularis** Koen. Jashpur, 2,800 feet, along stream.

353. **Justicia simplex** Don. Jashpur up to 3,400 feet at least in the open. Netarhat (Haines).

354. **Lepidagathis fasciculata** Nees. Surguja, in hill forest up to 3,400 feet.

355. **Lepidagathis hyalina** Nees. A very depauperated specimen was collected on the Mainpāt at 3,600 feet in grassland. It was not observed elsewhere.

356. **Nelsonia campestris** Br. Jashpur and Surguja up to 3,600 feet near streams and frequently under shade on clay in the forest. 'Netarhat, not common,' (Haines).

357. **Petalidium barlerioides** Nees. In dry ravines and on rocky slopes, more especially in hot exposed situations on basic rocks. Surguja and elsewhere up to about 3,000 feet but not common above that altitude.

* 358. **Ruellia Beddomei** Clarke. Chota Nagpur, 3,000 feet. (Haines.)

359. **Ruellia cernua** Roxb. A single specimen of a plant, which I am convinced is this, was collected on the Khudia plateau at about 3,400 feet in open grassland in a valley.

360. **Ruellia suffruticosa** Roxb. Frequent in open sal forest up to 3,500 feet in Jashpur. It will, no doubt, be found on the other plateaux. Also found in the open but generally near the fringe of the forest or scrub jungle.

361. **Rungia parviflora** Nees. In fairly open forest and scrub jungle up to about 3,500 feet in Jashpur and Surguja.

362. **Strobilanthes auriculatus** Nees. Occasional. Generally on slopes under shade in sal forest, or even more abundant in mixed forest on basic rock, especially in shady localities. Most frequent between 2,500 and 3,000 feet; but it ascends to 3,500 feet.

(**Strobilanthes callosus** DC. I mention this as I found it on the Daldali plateau in Kawardha State at 3,000 feet growing under conditions very similar to those on these *pāts* some 200 miles further west. It very likely extends to the eastern end of the Maikal Range at Amarkantak in Mandla District, which would be within one hundred miles of the Mainpāt. It was not recorded in our area; but it is conceivable that it may yet be found.)

Verbenaceae (10).

363. **Callicarpa arborea** Roxb. Occasional on the sides of hills, Surguja.

364. **Clerodendron siphonatus** Br. Jashpur and Surguja. Abundant in pasture land and glades, especially towards streams. Very common on the Mainpāt, 3,600 feet.

365. **Clerodendron squamatum** Vahl. Jashpur and Surguja, generally along fringes of the forest or in open scrub; but more especially in slightly moist situations. Mainpāt, 3,600 feet, in the Laliya valley.

366. **Gmelina arborea** Roxb. Scarce throughout the area in hill forest but large trees are very rare. Mainpāt 3,600 feet, at Kamaleswarpur.

367. **Holmskioldia sanguinea** Retz. Collected once in the Aswagaon ravine at about 3,200 feet on the northern slope of the Mainpāt.

368. **Lantana camara** Linn. Common in waste lands and on the banks of dry *nalas* up to 3,000 feet in Jashpur.

369. **Premna calycina** Haines. Surguja, occasional on the plateau lands and in hill forests.

370. **Premna flavescens** Ham. Rather rare and local in its occurrence. On rocky slopes of valleys in dry mixed forest, usually on basic rock. Jashpur, 2,400–2,500 feet.

371. *Premna herbacea* Abundant everywhere in open grasslands. Conspicuous in June and July.

372. *Vitex negundo* Linn. Mainpāt, 3,700 feet; and on other *pāts* near habitations.

Labiatae (22).

373. **Acrocephalus capitatus* Benth. Abundant in the open and in forest up to 3,500 feet in Jashpur. No doubt in other areas also.

374. *Anisochilus carnosus* Wall. Mostly on bare rocks in exposed situations. Collected at Kardhana in Jashpur at 3,100 feet but occurs at higher elevations.

375. *Anisomeles indica* O. Ktze. Occasional, generally under shade in the forest but nowhere very common. Scarce over 3,000 feet in Jashpur.

376. **Ajuga densiflora* Wall. Collected at Kamaleswarpur, 3,600 feet, on the Mainpāt. Recorded by Haines from Netarhat.

377. *Colebrookia oppositifolia* Sm. Shady ravines in Surguja up to 3,500 feet at least.

378. *Coleus Forskohlii* Br. Collected on a bare granite outcrop on Marual Hill at 2,500 feet, where it was growing gregariously, as appears to be its habit. This hill does not form part of the plateau lands of Khudia in Jashpur but is an outlier situated only a few miles to the south of the *pāts*.

379. **Dysophylla auricularia* Blume. Jashpur, 3,000–3,200 feet, close to stream in moist valley under shade. Netarhat (Haines).

380. *Dysophylla cruciata* Benth. Jashpur. In swamp at Dumarkona, 3,100 feet.

381. *Dysophylla pentagona* Clarke. Jashpur. In swamp at Dumarkona, 3,100 feet.

(*Dysophylla quadrifolia* Benth. Although this species is common in all rocky hills 2,000–4,000 feet from Singhbhum district south through Orissa, I have no record of its occurrence on the *pāts* of Surguja and Jashpur and am inclined to think that it does not occur.)

382. **Elscholtzia incisa* Roxb. 'Sunny slopes, *pāts* of Chota Nagpur. Netarhat 3,500 feet.' (Haines.)

383. *Lavandula bipinnata* Roth. Recorded by Haines from the *pāts* of Chota Nagpur. Seen occasionally in the Jashpur hills. No doubt it will also be found in Surguja if the area is visited in December and January, as it is very abundant in the higher hills of the Central Provinces. This plant is particularly partial to basic rocks and has not been observed below 2,000 feet.

* Characteristic of elevations over 3,000 feet.

384. **Leucas cephalotes** Spreng. Jashpur in cultivated lands up to 3,000 feet.

385. **Leucas montana** Spreng. Jashpur, in forest under moderate or light shade, 2,500–3,000 feet, but very likely ascends much higher—probably up to 4,000 feet.

386. ***Micromeria biflora** Benth. Jashpur and Surguja. Frequent along streams and on rocky banks generally on laterite and usually above 3,000 feet. Also recorded by Haines from Netarhat. It ascends to the summits of the *pāts*, 3,600–3,800 feet.

387. ***Micromeria capitellata** Benth. Very abundant along streams, always close to the water's edge, whereas *M. biflora* more often occurs on drier sites. Noted in Surguja and Jashpur ascending to 3,800 feet. Recorded from the *pāts* of Chota Nagpur by Haines. This plant and the preceding are very characteristic of elevations over 3,000 feet throughout the province.

388. **Mosla ocymoides** Buch.-Ham. In swampy ground near stream at Kardhana, 3,000 feet, Jashpur.

389. **Orthosiphon rubicundus** Benth. Frequent at all elevations in sal forest and scrub jungle. Conspicuous in May and June.

390. ***Plectranthus Coetsa** Buch.-Ham. Jashpur 3,000 feet. Netarhat (Haines).

391. **Plectranthus incanus** Link. Locally abundant under shade of trees in mango orchards and grooves of toon trees, as at Dumarkona, 3,000 feet, in Jashpur. Probably throughout the area and at even higher altitudes.

392. ***Plectranthus ternifolius** Don. Rare. Collected once in valley near Dumarkona at 3,000 feet in Jashpur. '*Pāts* of Chota Nagpur 3,000 feet and above.' (Haines.)

393. ***Scutellaria discolor** Colebr. Wet banks, Netarhat, 3,000 feet. (Haines.)

Plantaginaceae.

394. ***Plantago major** Linn. Collected in mud by edge of stream at 3,700 feet just below Nawadih village on Samri Pāt and also in a similar position at the head of the Macheri *nala*, 3,600 feet, on the Mainpāt. Not noted in Jashpur.

Amarantaceae.

395. **Achyranthes aspera** Linn. Jashpur. The locality has not been noted but it is likely to have been observed in hedges and waste ground near villages at all elevations.

396. **Alternanthera sessilis** Br. In open waste land, 2,700 feet, Jashpur. It will, no doubt, be found throughout the area.

* Characteristic of elevations over 3,000 feet.

397. **Amarantus spinosus** Linn. Jashpur, 3,000–3,500 feet, in or near cultivated land.

398. **Celosia argentea** Linn. A weed of dry upland cultivation throughout the area at all elevations.

Polygonaceae.

399. **Polygonum barbatum** Linn. Jashpur and Surguja in mud along streams up to about 3,000–3,200 feet.

400. ***Polygonum chinense** Linn. var. *ovalifolia* Meissn. 'Over 3,000 feet in the Central area.' (Haines.) Chota Nagpur is referred to.

401. **Polygonum glabrum** Willd. On bank of Ib river near Gullu, 2,500 feet, Jashpur. Not collected elsewhere but no doubt it will be found further up towards the source of the Ib up to at least 2,800 feet.

402. **Polygonum pedunculare** Wall. Netarhat (Haines).

403. **Polygonum plebejum** Br. Very common among shingle near streams and in moist situations generally. Throughout the area but apparently not so common at the higher altitudes.

404. **Polygonum serrulatum** Lagasc. Jashpur, 2,500 feet, by bank of Ib river at Gullu.

405. ***Polygonum strigosum** Br. Surguja, straggling among rocks near stream below Nawadih village at 3,600 feet, Samri Pāt. Also observed at about the same elevation on the Mainpāt in the Laliya valley. Netarhat (Haines).

Lauraceae.

406. **Litsea chinensis** Lamk. Along streams in Surguja and Jashpur. Fairly frequent above 2,500 feet. Not observed above 3,200 feet.

407. **Machilus macrantha** Nees. Netarhat near streams (Haines).

Proteaceae.

408. **Grevillea robusta** A. Cunn. has been planted on Netarhat.

Loranthaceae.

409. **Viscum orientale** Willd. Netarhat (Haines). **Loranthus longiflorus** Desr. was not observed on the *pāts*.

Santalaceae.

410. **Thesium unicaule** Haines. Chota Nagpur, elev. 3,000 feet (Haines). This appears to be an endemic.

* Characteristic of elevations over 3,000 feet,

Balanophoraceae.

411. **Balanophora polyandra** Griff. Netarhat (Haines).

Ulmaceae.

412. **Celtis tetrandra** Roxb. At Sanna in Jashpur, 3,000 feet; apparently planted.

413. **Trema politoria** Planch. Occasional in valleys up to 3,500 feet in both Surguja and Jashpur.

Urticaceae.

414. **Boehmeria platyphylla** Don. Rare and generally very local in damp ravines in Surguja and Jashpur, ascending to about 3,500 feet, above which suitable sites do not occur.

415. ***Distemon indicum** Wedd. 'Ranchi 3,000 feet, under shade in rocky places.' (Haines.) Hence most probably on the Ranchi *pāts*.

416. **Pouzolzia pentandra** Benn. Locally frequent in Jashpur and Surguja in swampy ground and along streams. Jashpur, 2,700 feet, near Sanna. Surguja, 3,500 feet, at Sarangjobi near Samri Pāt. Noted by Haines at Netarhat.

Moraceae.

417. † **Artocarpus lakoocha** Roxb. Very rare in Surguja; only once seen on the Mainpāt at 3,600 feet by the side of stream. Not observed in Jashpur nor is it recorded by Haines from Netarhat.

418. **Ficus cunia** Ham. Fairly common throughout, mostly on the banks of streams or on the lower slopes of hills. Occurs up to 3,600 feet at least.

419. **Ficus comosa** Roxb. Scarce; generally in ravines and moist places.

420. **Ficus bengalensis** Linn. Frequent throughout the plateau lands, 3,400–3,800 feet, mostly near villages.

421. **Ficus glabella** Blume. Jashpur and Netarhat, 3,400–3,600 feet.

422. **Ficus infectoria** Roxb. Occasional. Mainpāt, 3,500 feet, Surguja.

423. **Ficus hispida** Linn. f. Ravines in Jashpur and Surguja, occasional up to 3,500 feet.

424. **Ficus lanceolata** Roxb. Along streams on the Mainpāt, 3,400–3,700 feet, where it is common. Not recorded from other areas.

425. **Ficus palmata** Forsk. This small shrub was collected on the high eroded bank of the Ib river near Sanna in

* Characteristic of elevations over 3,000 feet.

† NOTE :—417a. *Cudrania javanensis* Trecul has now been recorded from the Mainpāt, 3,600 feet.

Jashpur at about 2,900 feet. This is a new record for the province and was not seen elsewhere.

426. *Ficus religiosa* Linn. Mostly near villages; everywhere, at all elevations.

Salicaceae.

427. *Salix tetrasperma* Roxb. Occasional along streams mostly over 2,500 feet and ascending to 3,600 feet at Kamaleswarpur on the Mainpāt, where it is fairly abundant along the stream with *Pyrus Pashia* and *Ehretia acuminata*.

MONOCOTYLEDONS.

Alismaceae.

428. *Butomopsis lanceolata* Kunth. Collected from ricefields at Dumarkona, 3,000 feet, Jashpur.

429. *Sagittaria sagittifolia* Linn. Surguja (Wood) recorded by Haines; probably from over 2,400 feet elevation.

Araceae.

430. *Colocasia fallax* Schott. Ranchi and Palamau on the *pāts*. (Haines.)

Palmaceae.

431. *Phoenix acaulis* Buch.-Ham. Jashpur and Surguja in open sal forest, 3,000 feet, locally frequent.

Cyperaceae (33).

432. *Carex filicina* Nees. Under shade in hill sal forest, 2,700 feet, Marual Hill, Jashpur.

433. *Carex rhizomatosa* Steud. *Pāts* of Ranchi and Palamau (Haines).

434. *Courtosia cyperoides* Nees. Edge of pond in mud on *pāt* above Dumarkona, 3,400 feet, Jashpur.

435. *Cyperus compressus* Linn. Along stream at Kedma, 2,000 feet, just below the Mainpāt.

436. *Cyperus cyperoides* (L.) O. Kze. (Syn. *Mariscus Sieberianus* Nees.) Occasional in open forest about 2,500 feet, Jashpur.

437. *Cyperus dilutus* Vahl. (Syn. *C. compactus* Retz.) In ricefield at Dumarkona, 3,000 feet, Jashpur.

438. *Cyperus eragrostis* Vahl. (Syn. *Pycnus sanguinolentus* Nees.) In ricefield, Dumarkona, 3,000 feet.

439. *Cyperus globosus* All. var. *stricta* (*Pycnus globosus* Reichb.) In swamp above Sardih, 3,000 feet, Jashpur. Also at Kamaleswarpur along stream on Mainpāt, 3,600 feet.

440. *Cyperus irla* Linn. Abundant in ricefields around Sogra, 2,700 feet. No doubt frequent elsewhere but not noted.

441. *Cyperus latespicatus* Boeck. (Syn. *Pycneus latespicatus* Clarke). Recorded from Surguja (Clarke) by Haines. Collected by me in Jashpur.

442. *Cyperus niveus* Retz. Frequent in sal forest under light shade or in the open, especially on sandy soil. Jashpur up to 3,500 feet. It will also be found in other areas.

443. *Cyperus nutans* Vahl. Ranchi, 3,000 feet. (Haines.)

444. *Cyperus Pangorei* Rottb. (Syn. *C. tegetum* Roxb.) Abundant along streams in the open. Jashpur at Dumarkona, 3,000 feet. Also seen in Surguja.

445. *Cyperus pilosus* Vahl. In swamp above Sardih, 3,000 feet, Jashpur.

446. *Elaecharis congesta* Don. 'Hills of Chota Nagpur over 2,000 feet; Surguja (Clarke).' (Haines.)

447. **Fimbristylis aestivalis* Vahl. Ranchi and Palamau on the *pāts* (Haines). Common along stream at Kamaleswarpur on the Mainpāt, 3,600 feet.

448. *Fimbristylis diphylla* Vahl. var. *pluristriata* Cl. Jashpur up to 3,000 feet and, no doubt, ascending higher; generally along streams and *nalas*. Surguja, in swamp at Sarangjobi, 3,500 feet, and in swampy ground on the Mainpāt, 3,600 feet. Recorded by Haines from Ranchi and Palamau. Var. *annua* was collected in Jashpur.

449. *Fimbristylis quinquangularis* Kunth. Collected in ricefield at Dumarkona and in swamp above Sardih, both about 3,000 feet, Jashpur.

450. *Fimbristylis schoenoides* Vahl. Jashpur, in ricefield at Dumarkona, 3,000 feet.

451. *Fimbristylis tetragona* Br. More or less gregarious but very local. In swampy ground by stream at Kardhana, 3,000 feet, Jashpur.

452. *Kyllinga brevifolia* Rottb. A very common little sedge in dry situations in sal forest, especially on sandy soil. Up to 3,500 feet in Jashpur and Surguja.

453. *Kyllinga triceps* Rottb. This little sedge much resembles the foregoing. It was not collected anywhere but it would be very surprising if it did not occur, as it is common in similar localities to *K. brevifolia* at lower elevations.

454. *Lipocarpa argentea* Br. In mud by stream, 3,700 feet, below Nawadih village, Samri Pāt. Also collected at Sanna, 3,000 feet, in Jashpur. Observed several times elsewhere on the *pāts* but always rooting in mud close to permanent water.

* Characteristic of elevations over 3,000 feet.

455. *Lipocarpa spaceolata* Kunth. Jashpur, 2,600 feet, in marshy ground in forest glade on Marual Hill.

456. **Rynchospora gracillima* Clarke. In wet grassland in forest near Sankiar, 2,500 feet, Jashpur. This is the first time that this delicate sedge has been recorded in the province of Bihar and Orissa (as covered by Haines' *Botany*.)

457. *Scirpus erectus* Poir. Jashpur. In ricefields at Dumarkona, 3,000 feet.

458. *Scirpus grossus* Linn. f. Collected in ricefield at Sogra, 2,700 feet, and by the side of a stream at Pendra Pât, 3,600 feet, in Jashpur; also seen in Surguja.

459. *Scirpus mucronatus* Linn. Jashpur. In swamp above Sardih, 3,000 feet.

460. **Scleria annularis* Kunth. In wet grassland, almost swampy in September, by side of stream at Kardhana, 3,000 feet, Jashpur. Locally very abundant where collected but not observed elsewhere. Haines mentions having collected this little sedge in Bilaspur district in the C.P.; but he did not find it in the area covered by his *Botany*. This therefore constitutes the first record for the province.

461. *Scleria cochinchinense* Druce. Under shade in swampy ground at Dumarkona, 3,100 feet, Jashpur.

462. *Scleria hebecarpa* Nees. In sal forest above Gullu, 3,000 feet, Jashpur.

463. *Scleria pergracile* Kunth. In moist grassy glade in sal forest near Sankiari, about 2,500 feet, Jashpur.

Gramineae (79).

464. *Alloteropsis semialata* Hitch. 'Chota Nagpur above 2,000 feet. A very common grass both in the open and in the forest at about 3,000 feet, Ranchi and Palamau.' (Haines.) This grass was not observed by me in Jashpur or Surguja; but this may be due to the fact that it usually flowers in July-August, two months during which I have not visited the *pâts*.

465. **Andropogon ascinodis* Trin. In rather open sal forest, 2,500 feet, near Sankiari, Jashpur.

466. *Apluda aristata* Linn. This is a common grass of the hill forests and is found throughout the area under slight or moderate shade up to about 3,000 feet. It is not common above this altitude and was not observed on the open *pâts*.

467. *Aristida Cumingiana* Trin. Collected several times in Jashpur, 2,500-3,500 feet, generally in open grassy glades in the forest on rather sandy soil.

468. *Arthraxon hispidus* (Thunb.) Makino. In depressions, on the *pâts* in pasture or under light shade in sal forest. Above Sardih, 3,200 feet, Jashpur.

* Characteristic of elevations over 3,000 feet.

469. *Arundinella pumila* Steud. Under moderate shade in sal forest, 3,000 feet, Kardhana, Jashpur; and also at higher altitudes.

470. *Arundinella setosa* Trin. Jashpur. Occasional on dry rocky ground in the open; also in Surguja on the Mainpāt at 3,500 feet.

471. *Arundinella Wallichii* Nees. Jashpur. In valley pasture near Sardih, 2,900 feet.

472. *Bothriochloa intermedia* A. Camus. Not so abundant as the foregoing but occurs frequently along the edge of the jungle and in open forest. Jashpur, up to 3,400 feet.

473. *Bothriochloa pertusa* (Willd.) A. Camus. This is, perhaps, the commonest grass in open pastures and on the *pāts*, at any rate in late September and early October. Up to 3,600 feet in Jashpur; but it most probably will be found to ascend to 4,000 feet on Lahsun Pāt in Surguja.

474. *Brachiaria ramosa* Stapf. Also a common grass of the *pāts* and open pastures. Jashpur; but probably it occurs on all the *pāts* up to 4,000 feet.

475. *Capillipedium assimile* A. Camus. Occasional and generally rather local in forest, 2,500–3,000 feet. Not on the open *pāts*. Jashpur.

476. *Capillipedium parviflorum* Stapf. var *villosulum* Haines. Netarhat, frequent. (Haines.)

477. *Chionachne Koenigii* Thw. (Syn. *Polytoca barbata* Stapf.) Jashpur, 2,500–3,000 feet. Noted at Netarhat by Haines.

478. *Chloris virgata* Sw. Jashpur, in dry cultivated lands and pasture at Pongru, 1,500 feet; but it almost certainly occurs at higher elevations, at least up to 2,500 feet.

479. *Chrysopogon aciculatus* Trin. Not very common but occasionally met with in overgrazed pastures. Jashpur, 3,000 feet.

480. *Chrysopogon lancearius* Haines. Jashpur in rocky hills. Marual Hill 2,600 feet.

481. *Chrysopogon montanus* Trin. Jashpur. Locality not noted but probably on waste land below 3,000 feet.

482. **Coelachne simpliciuscula* Munro ex Benth. Collected at 2,000 feet in swampy ground near a stream in Kedma village at the foot of the Mainpāt, Surguja. It will almost certainly be found at higher altitudes on the *pāts* in suitable sites, as it occurs up to at least 3,000 feet in the hills of Kalahandi State.

483. *Coelorrachis Clarkei* Blatter & McCann. In glade in moist valley by stream with slight shade, 3,000 feet, Kardhana, Jashpur.

484. *Coix lachryma-jobi* Linn. Jashpur. Moist ground in valley, 2,700 feet.

* Characteristic of elevations over 3,000 feet.

485. *Cymbopogon Martini* Stapf. By no means common. Occasional on dry rocky sites up to 3,500 feet at least and probably higher.

486. *Cyrtococcum patens* A. Camus. Swampy ground under moderate shade near Sardih, 3,000 feet, Jashpur.

487. *Digitaria marginata* Link. var. *purpurea*. Natarhat, 3,000 feet (Haines).

488. *Digitaria Royleana* Prain. Jashpur, on dry upland at Kardhana, 3,000 feet.

489. *Echinochloa stagnina* Beauv. Along margin of pond in mud on the grassy *pât* above Dumarkona, 3,400 feet, Jashpur.

490. *Eragrostis brachyphylla* Stapf. Jashpur, abundant. Hence probably as common in Surguja and other localities also.

491. *Eragrostis coarctata* Stapf. Jashpur. Abundant on dry upland at Kardhana, 2,800 feet.

492. *Eragrostis gangetica* Steud. Moist ground in bed of sandy *nala* at Sanna, 2,800 feet, Jashpur. Also at Dumarkona 3,000 feet.

493. *Eragrostis japonica* Trin. (Syn. *E. interrupta* Beauv. var. *tenuissima*.) In sal forest under moderate shade at Champa Pât, 3,400 feet, Jashpur.

494. *Eragrostis tenella* Roem. & Schl. Throughout the area but local; generally near habitations and on overgrazed pastures. Most abundant about 2,500–2,700 feet and possibly not ascending to the summits of the *pâts*, where I have no record of it.

495. **Eragrostis tenuifolia* Hochst. Very abundant in open grassland on the *pâts*. One of the commonest grasses on dry soils on the plateaux. Dumarkona, 3,000–3,400 feet, Jashpur. This is a new record for Bihar and Orissa.

496. *Eleusine indica* Gaertn. Jashpur. In damp ground on the *pât* above Dumarkona, 3,300 feet; and in open sal forest on Jamunia Pât, 3,400 feet. Not very common.

497. *Eulalia argentea* Brongn. A forest grass. Found under light to moderate shade on slopes leading up to the *pâts* throughout the area but not very frequent over 3,000 feet and not actually collected on the summits of any of the *pâts*.

498. *Eulalia fulva* (R. Br.) O. Kze. (Syn. *E. Cummingii* Nees). Jashpur. Gregarious on grassy bank about eight feet above stream in cool valley near Kardhana, 2,800 feet, Jashpur.

499. *Garnotia stricta* Brongn. On almost bare granite, a very dry site, in a cool valley near Kardhana, 3,000 feet, Jashpur.

500. *Hackelochloa granularis* O. Kze. A small grass. Abundant on dry stony waste land at Kardhana, 2,800 feet.

* Characteristic of elevations over 3,000 feet.

501. **Heteropogon contortus** Roem. Jashpur and Surguja, throughout the area; generally forming gregarious patches. Not so abundant above 3,200 feet.

502. **Imperata cylindrica** Beauv. var. **Koenigii** Dur. & Sch. Open pasture land; frequent but very stunted on the Mainpāt, principally on gentle slopes of open valley, 3,500–3,700 feet.

503. **Isachne globosa** (Thunb.) O. Kze. Abundant in ricefields. Dumarkona, 3,000 feet, Jashpur.

504. **Ischaemum aristatum** Linn. Growing on granite rocks in glen above Sardih, 2,800 feet, Jashpur.

505. **Ischaemum rugosum** Salisb. Occasional in moist ground, edges of ricefields, etc., 2,500–3,000 feet mostly, Jashpur. Also probably in Surguja and other areas.

506. **Iseilema laxum** Hack. Abundant in fields, especially on moist clays. Mostly at lower elevations and not seen above 2,500–2,700 feet.

507. **Leersia hexandra** Sw. Jashpur. Edge of ricefield at Dumarkona, 3,000 feet.

508. **Narenga porphyrocoma** (Hance) Bor. * In glades and wet ground up to 3,600 feet, Surguja.

509. **Ophiurus perforata** Roxb. Jashpur. Mostly in forest glades and open jungle, 2,500–3,000 feet.

510. **Oplismenus compositus** Beauv. This grass was only seen in one or two moist valleys under fairly heavy shade in the forest near Gullu about 2,500 feet. I doubt if it occurs at higher elevations but this may be due to lack of suitable sites and not to the altitude *per se*. It becomes common in such situations especially in 'mixed forest' below 2,500 feet.

511. **Oplismenus Burmanni** Beauv. This also is not common in the hill tracts. It comes in about 2,500 feet and becomes increasingly abundant below that. Under shade in village mango groves and on sandy banks under shade.

512. **Oryza sativa** Linn. The commonest crop. Raised as a dry crop on uplands and in wet terraced paddy fields in the valleys and on their lower slopes.

513. **Panicum humile** Nees. Very abundant on dry, stony upland at Kardhana, 2,800 feet, Jashpur.

514. **Panicum montanum** Roxb. Jashpur. Locally abundant under shade in valleys in the forest, 2,500–3,000 feet. 'Palamau ascending to the tops of the *pāts*.' (Haines.) A forest grass; not typical of open plateau lands.

515. **Panicum psilopodium** Trin. Jashpur. In bed of river at Sankiari, 2,600 feet.

516. **Panicum trypheron** Schult. Meadow land in valley. Sankiari, 2,600 feet.

517. **Paspalum scrobiculatum** Linn. Occasional as a crop (*kodo*) in Surguja. I do not appear to have noted it in the wild state although no doubt it occurs.

518. *Paspalidium flavidum* Stapf. Does not appear to be quite so abundant as at lower levels but was observed along edges of ricefields and in damp grasslands up to 3,000 feet at Dumarkona.

519. *Perotis latifolia* Ait. By no means common anywhere nor as conspicuous as it is along roadsides and on overgrazed pastures in the plains. It was noted two or three times near Kardhana about 2,800 feet, on dry, rather sandy soils.

520. *Phragmites karka* Trin. Rather scarce but occasionally seen along banks of the Ib river, 2,500 feet. It was also observed along a stream at Kamaleswarpur about 3,600 feet; but it is clearly rare at levels above 3,000 feet. Jashpur and Surguja.

521. *Pogonatherum paniceum* Hack. Along fringes of forest streams under light shade or in the open. Common along the Macheri and Laliya *nalas*, 3,600–3,700 feet, mostly on laterite. Jashpur and Surguja.

522. *Puliculum articulata* Stapf. In open forest up to 3,000 feet. Not very abundant but widespread. Jashpur and Surguja.

523. *Rottboelia exaltata* Linn. f. Not common anywhere and was not observed above 3,000 feet. Occasional along the edges of ricefields, especially where they approach the forest. Along forest stream at Kardhana, 2,800 feet, Jashpur.

524. *Saccharum spontaneum* Linn. Along streams and edges of ricefields up to 3,000 feet at Dumarkona; but it is not nearly so abundant as in the plains. It may be found at higher elevations in suitable situations but was not actually observed.

525. *Sacciolepis indica* Chase. In moist pasture land at Sankiari, 2,600 feet; and in swamp above Dumarkona, 3,100 feet, Jashpur. No doubt elsewhere in similar localities.

526. *Sehima nervosum* Stapf. A forest grass, generally found growing under slight shade or in open scrub jungle. Mostly on the slopes of the *pāts* but scarce above 3,000 feet and not seen anywhere on the open plateau lands.

527. *Setaria intermedia* Roem. & Sch. In villages on the *pāts* of Jashpur, 3,200–3,400 feet; and also along the fringe of the forest, though rarely; generally in second growth scrub and seldom far from clearings, as at Kardhana.

528. *Setaria lutescens* (Weigall) Hubb. (Syn. *S. glauca* Beauv.) Abundant in dry crops in uplands and on the *pāts*. Saila, 2,800 feet, and above Dumarkona, 3,300 feet, Jashpur. This is a common grass and will be found throughout the tract at all altitudes.

529. **Setaria palmaefolia* Stapf. Rare and then only in moist (often swampy) localities in the forest but not always

* Characteristic of elevations over 3,000 feet.

under shade. Banks of perennial streams. This is a high-level grass (at any rate in our area) and occurs more frequently above 3,000 feet in Jashpur and Surguja, although nowhere abundantly. Recorded from Ranchi and Palamau (Netarhat 3,000 feet) by Haines.

530. *Sorghum halepense* Pers. Banks of the Ib river above Sankiari, 2,700 feet, Jashpur. Locally abundant along the river and not observed elsewhere.

531. *Sorghum nitidum* Pers. This is more of a forest grass, occurring on rocky ground usually under light shade or in the open up to about 3,000 feet. Apparently not so abundant above this.

532. *Sorghum vulgare* Pers. Occasionally cultivated on homestead lands 2,500–3,000 feet. Not actually observed above this level or on the *pāts*.

533. *Sporobolus diander* Beauv. Very abundant at all altitudes, especially the valleys. Dumarkona, 3,000 feet, Jashpur.

534. *Sporobolus indicus* R.Br. Abundant in all but the driest localities, especially in grasslands in the valleys. Dumarkona, 3,000 feet, Jashpur.

535. **Sporobolus piliferus* Kunth. A small grass. It is exceedingly abundant on dry stony uplands at Kardhana, Jashpur. This is the first record of this grass from Bihar and Orissa.

536. *Themeda arundinacea* Ridl. Recorded from Netarhat and Seemah forest, Palamau by Haines.

537. *Themeda caudata* Dur. & Jack. Recorded from Netarhat by Haines.

538. *Themeda quadrivalvis* O. Ktze. Abundant on the Mainpāt and Samri Pāt in Surguja, 3,500–3,800 feet. Not noted on the Jashpur plateaux but must certainly occur there as it is recorded by Haines from Netarhat.

539. *Themeda triandra* Forsk. Surguja, abundant on the Mainpāt, 3,400–3,800 feet.

540. *Thysanolaena maxima* O. Ktze. Jashpur and Surguja on banks of streams and in ravines in hill forest. Frequent up to 3,500 feet in suitable localities; but not on the open *pāts*.

541. *Vetiveria zizanioides* Stapf. Not so common as in the plains and not observed on the higher *pāts*. Occasional on banks of ricefields and in other damp situations, 2,500–3,000 feet in Jashpur; and, no doubt, in Surguja.

542. *Zea Mays* Linn. Commonly cultivated on uplands and near homesteads up to 3,500 feet.

* Characteristic of elevations over 3,000 feet.

Eriocaulaceae.

543. **Eriocaulon collinum* Hook. f. Netarhat near streams (Haines).

544. **Eriocaulon longicuspis* Hook. f. var. *polycephala* Fyson. In swamp at Dumarkona, 3,100 feet, Jashpur.

545. **Eriocaulon oryzetorum* Mart. In swamp at Dumarkona, 3,100 feet, Jashpur. Recorded from Surguja (Clarke) in Haines' *Botany*.

546. *Eriocaulon quinquangulare* Linn. Frequent in ricefields in damp localities at all altitudes.

Xyridaceae.

547. **Xyris coronata* Haines. In swamp at Dumarkona, 3,100 feet, Jashpur. 'Ranchi *pāts* among grass, 3,000 feet.' (Haines.) This has the appearance of being an endemic.

548. *Xyris pauciflora* Willd. 'Plateaux of Chota Nagpur, Ranchi *pāts* among grass.' (Haines.)

Commelinaceae.

549. *Aneilema scapifolium* Wight. Common on the plateaux at all elevations and much in evidence in May and June.

550. *Aneilema vaginatum* Br. In damp ground near stream, Jashpur, 3,000 feet.

551. *Aneilema spiratum* Br. In ricefields at Dumarkona, 3,000 feet.

552. *Commelina nudiflora* Linn. Frequent in moist situations, generally in grass near streams or bordering ricefields, 2,500–3,000 feet, Jashpur. Also no doubt in Surguja.

553. *Commelina bengalensis* Linn. Very common in damp places up to about 3,000 feet in Jashpur (and no doubt in Surguja) but apparently not so abundant above that. A visit to the area in July and August would add to the number of the *Commelinaceae* recorded.

554. *Cyanotis tuberosa* Schult. Under shade in the forest, 2,500–3,000 feet in Jashpur.

555. *Floscopa scandens* Lour. Jashpur and Surguja. Collected along the margins of streams, sometimes in the open but more generally under shade, up to 3,700 feet in Surguja. Recorded from Ranchi and Palamau, 3,000 feet, by Haines.

Juncaceae.

556. *Juncus primatocarpus* R.Br. Frequent along edges of streams and in swampy ground throughout the area

* Characteristic of elevations over 3,000 feet.

from 2,500 to 3,800 feet. Abundant along streams on the Mainpāt in Surguja and in similar places in Jashpur.

Lilaceae.

557. *Asparagus gracilis* Royle. Forests near Netarhat, 2,500–3,000 feet (Haines).

558. *Asparagus racemosus* Willd. Frequent in forests on slopes and on the *pāts* in Jashpur and Surguja.

559. *Chlorophytum arundinaceum* Baker. Frequent on all *pāts* at all elevations, occurring in the open but commonest under moderate shade in the forest. 'Chota Nagpur, ascending to the tops of the *pāts*.' (Haines.)

560. *Dianella ensifolia* Red. 'Rocky ravines, *pāts* of Ranchi and Palamau (Netarhat 3,000 feet).' (Haines.)

561. *Disporum pullum* Salisb. Recorded from Netarhat by Haines. Although I have collected this plant several times throughout the hills of Orissa and Singhbhum, I have not noted it either from Jashpur or Surguja. It will certainly be found there.

562. *Smilax prolifera* Roxb. Frequent in sal forest up to 3,500 feet, Jashpur. No doubt it occurs in all the other areas up to this elevation or higher.

Amaryllidaceae.

563. *Curculigo orchoides* Gaertn. Common throughout the area at all elevations especially on clay soils under some shade in the forest.

564. *Curculigo recurvata* Dryand. In swamp at Dumarkona, 3,100 feet, Jashpur.

565. *Hypoxis aurea* Lour. *Pāts* of Chota Nagpur (Haines).

566. *Pancratium triflorum* Roxb. Frequent in the Laliya valley, 3,600 feet, and elsewhere on the Mainpāt in open grassland. Also probably on the other *pāts*.

Dioscoreaceae.

567. *Dioscorea belophylla* Voight. Collected on Dhaura Pāt, 3,400 feet, Jashpur.

568. *Dioscorea pentaphylla* Linn. Jashpur, 3,300 feet, in jungle on *pāt*. No other *Dioscoreas* were collected but, no doubt, others occur.

Burmanniaceae.

569. *Burmannia coelestis* Don. Swampy ground near Dumarkona, 3,100 feet, Jashpur. Recorded from Ranchi, 2,000–3,000 feet, by Haines.

* Characteristic of elevations over 3,000 feet.

Musaceae.

570. **Musa sapientum** Linn. Rare. A few occur in a ravine on the southern slope of the Mainpāt at about 3,200 feet and in a swamp near Chapi on Samri Pāt, 3,500 feet. Also at Kardhana and Dumjharan in Jashpur about 3,000 feet; and I recollect having seen it on the northern slopes of Netarhat in steep ravines.

Zingiberaceae.

571. **Costus speciosus** Smith. Abundant, especially on banks of streams and in moist glades in the forest. Throughout the hills, ascending to 3,200 feet or slightly more.

572. **Curcuma angustifolia** Roxb. Frequent. Generally in grass near streams. Laliya valley, Mainpāt, 3,600 feet.

573. **Curcuma amada** Roxb. Locally abundant, generally in the forest under shade, Jashpur and Surguja.

574. **Globba racemosa** Smith. Shady banks in the forests, 2,500–3,000 feet, Jashpur.

575. **Globba bulbifera** Roxb. In similar localities to the preceding. Both these herbs will certainly be found in Surguja, which I have not visited during the rains or early cold weather.

576. ***Hedychium coronarium** Koen. In swamp at Dumarkona, 3,100 feet, and on bank of stream near Kardhana, 3,000 feet, both in Jashpur. In addition I have noted the plant twice near Sarangjobi on Samri Pāt in Surguja at about 3,500 feet. It has been recorded from Ranchi and Palamau over 2,000 feet by Haines. This is a very beautiful plant with its white scented flowers. It is widely distributed in the province in cool moist situations above 2,000 feet but is nowhere abundant.

577. **Zingiber capitatum** Roxb. In sal forest in valleys 2,500–3,000 feet, Jashpur.

578. **Zingiber rubens** Roxb. Ranchi over 2,000 feet (Haines).

Marantaceae.

579. **Phrynium capitatum** Willd. Rare. Collected in swampy ground under fairly heavy shade at Dumarkona, 3,100 feet, Jashpur.

Orchidaceae (30).

580. **Aerides multiflorum** Roxb. Recorded from Surguja by Fr. Cardon (Haines).

581. **Bulbophyllum triste** Reichb. Netarhat (Cardon) recorded by Haines.

* Characteristic of elevations over 3,000 feet.

582. *Cirrhopetalum ornatissimum* Reichb. Jashpur (Cardon) recorded by Haines.

583. **Cleisostoma micranthum* King & Pantl. Surguja (Cardon) quoted by Haines.

584. *Dendrobium crepidatum* Lindl. Frequent on the Mainpāt in Surguja, 3,400–3,800 feet, is scarce elsewhere.

585. *Dendrobium fimbriatum* Hook. Surguja (Cardon).

586. *Dendrobium formosum* Roxb. 'I have also seen an orchid like this but not in flower at Netarhat.' (Haines.)

587. *Dendrobium macrostachyum* Lindl. Jashpur (Cardon).

588. *Dendrobium moschatum* Wall. Surguja (Cardon).

589. *Dendrobium pygmaeum* Lindl. Jashpur (Cardon).

590. *Dendrobium transparens* Wall. Surguja (Cardon).

591. *Eulophia campestris* Wall. Jashpur, 3,200 feet, frequent. Recorded by Haines from Netarhat.

592. *Eulophia flava* Hook. f. Jashpur, 3,200 feet, near Kardhana. Recorded by Haines from Palamau, 3,000 feet.

593. *Eulophia nuda* Lindl. Collected once on the Mainpāt at 3,500 feet in the forest on laterite under moderate shade.

594. *Habenaria commelinifolia* Wall. Occasional, 2,500–3,000 feet, in ricefields. Collected in Jashpur.

595. *Habenaria diphylla* Dalz. Recorded by Haines as having been found in Surguja by Fr. Cardon. No doubt fairly common up to 4,000 feet, as I have collected it at this elevation in Bastar State. Not having visited the area in July and August, when it flowers, I have no record of this attractive little orchid.

596. *Habenaria furcifera* Lindl. Surguja (Cardon) in Haines' *Botany*.

597. *Habenaria longicalcarata* A. Rich. I collected one specimen of this orchid at Sogra in Jashpur, 2,700 feet, on a grassy bank above a stream. No doubt many more species of *Habenaria* would be found if a further search were made during the middle of the monsoon.

598. **Liparis bituberculata* Lindl. Netarhat (Haines); Surguja (Cardon).

599. *Liparis nervosa* Lindl. Surguja (Cardon) recorded by Haines.

600. **Luisia trichorrhiza* Blume. Surguja (Cardon).

601. **Microstylis congesta* Reichb. Surguja (Cardon).

602. **Microstylis Cardoni* Prain. 'Probably from Surguja or Jashpur plateau.' (Haines.)

603. *Phajus Wallichii* Lindl. I have heard an orchid described from Netarhat which I think must be this species. I have collected *Phajus Wallichii* in Singhbhum district and it occurs at Pachmarhi in the Central Provinces. It is therefore not improbable that it may be found at Netarhat. It was

* Characteristic of elevations over 3,000 feet.

described to me as growing in grass near a stream, which is the habitat in which I found the Singhbhum specimen.

604. *Pholidota imbricata* Lindl. Netarhat (Haines).

605. *Pogonia flabelliformis* Lindl. Netarhat (Haines).

606. *Saccolabium papillosum* Lindl. Surguja (Haines) probably collected by Fr. Cardon.

607. **Thunia venosa* Rolfe. Surguja (Cardon).

608. *Vanda parviflora* Lindl. Surguja, rare. Recorded by Haines from Netarhat.

609. *Vanda tessellata* Hook. Netarhat (Haines). It is almost certain to occur on the other plateaux but I have not noted it, so it is likely to be scarce.

FERNS, HORSE-TAIL, CLUB-MOSS AND SELAGINELLAS.

Polypodiaceae (15).

610. *Adiantum caudatum* Linn. In somewhat similar localities under shade in hill forest. Collected near Gullu, about 2,500 feet, Jashpur. Not seen at higher elevations.

611. *Adiantum lunulatum* Burm. Jashpur, on moist bank in the forest about 2,500 feet.

612. *Athyrium Hohenackerianum* (Kze.) Moore. Collected on moist bank in shady glen along stream near Kardhana, 3,100 feet, Jashpur.

613. *Blechnum orientale* Linn. Surguja. Occasional along streams up to 3,700 feet on the Mainpāt and Samri Pāt but does not attain its maximum development here, the plants being seldom more than twelve inches high. Also probably in Jashpur and on Netarhat but not recorded.

614. *Cheilanthes farinosa* Kaulf. Jashpur and Surguja on banks, 2,500–3,500 feet.

615. *Cheilanthes tenuifolia* Sw. Jashpur and Surguja, in similar but rather more shady situations than the foregoing and perhaps not so common over 3,000 feet.

616. *Diplazium esculentum* Sw. Frequent along edges of streams, more particularly in the forest, but not usually under shade. Dumarkona, 3,000 feet, Jashpur; also on Mainpāt, 3,600 feet, in Surguja. Recorded from Ranchi, 3,000 feet, by Haines.

617. *Dryopteris calcarata* (Bl.) O. Kze. Surguja on the Mainpāt, 3,600 feet. (Syn. *D. arbuscula* (Willd.) O. Kze.)

618. *Dryopteris cochleata* (Don) C. Chr. 'Ranchi and Palamau, common at 3,000 feet.' (Haines.)

619. *Gymnopteris variabilis* Hook. Ranchi, 2,000–3,000 feet. (Haines.)

* Characteristic of elevations over 3,000 feet.

620. *Nephrodium aridum* Don. Netarhat (Haines).
 621. *Nephrodium molle* Desv. Surguja and Jashpur. Frequent near streams in the forest and also to some extent in the open. Up to 3,600 feet on the Mainpāt.
 622. *Nephrodium moulmeinense* Bedd. Surguja and Jashpur; along streams up to 3,600 feet on the Mainpāt.
 623. *Odontosoria chinensis* J. Sm. Frequent along streams under shade of bank on Mainpāt, 3,600–3,700 feet, especially near Kamaleswarpur and along the Maheri and Laliya *nalas*. Rather rare on Samri Pāt at similar elevations.
 624. *Pleopeltis linearis* Bedd. Netarhat (Haines).
 625. *Pteridium aquilinum* Kuhn. The Bracken. Rare, but occurs locally in small gregarious patches in sheltered positions, not generally under shade. Jashpur, 2,700 feet, near Patia; the lowest altitude at which I have seen this fern. Surguja near Nawadih village just under the crest of the *pāt*, 3,750 feet. Also once noted just below the lip of the plateau on the Mainpāt at about 3,600 feet. This fern has not been recorded by Haines from either Netarhat or Parasnath Hill; but I have collected it in Singhbhum and Bonai further south and also in the Kala-handi hills and in Bailadila Hill in Bastar; in all cases above 3,000 feet.

Schizaeaceae.

626. *Lygodium flexuosum* Sw. Frequent on banks in the forest under shade. Jashpur, 2,500–3,000 feet; and also probably in Surguja in similar localities.

Equisetaceae.

627. *Equisetum debile* Roxb. Collected at Kardhana, 3,100 feet, in Jashpur and observed at Kamaleswarpur on the Mainpāt at 3,600 feet along edge of streams in both cases.

Lycopodiaceae.

628. *Lycopodium cernuum* Linn. Netarhat (Haines) Collected by me in swampy ground in Laliya valley about 3,400 feet, Mainpāt.

Selaginellaceae.

629. *Selaginella caulescens* Spring. On moist shady banks in the forest. Surguja at Nawadih, 3,750 feet, on Samri Pāt; and also on the Mainpāt at 3,600 feet. Probably throughout the area in suitable situations up to 4,000 feet.

630. **Selaginella rupestris* Spring. Recorded by Haines from the higher mountains of Chota Nagpur above 3,000 feet.

* Characteristic of elevations over 3,000 feet.

I have not personally observed the plant in Jashpur or Surguja but I have collected it on the summit of Malyagiri Hill, 3,896 feet, in Pal Lahara State, Orissa.

CONCLUSIONS.

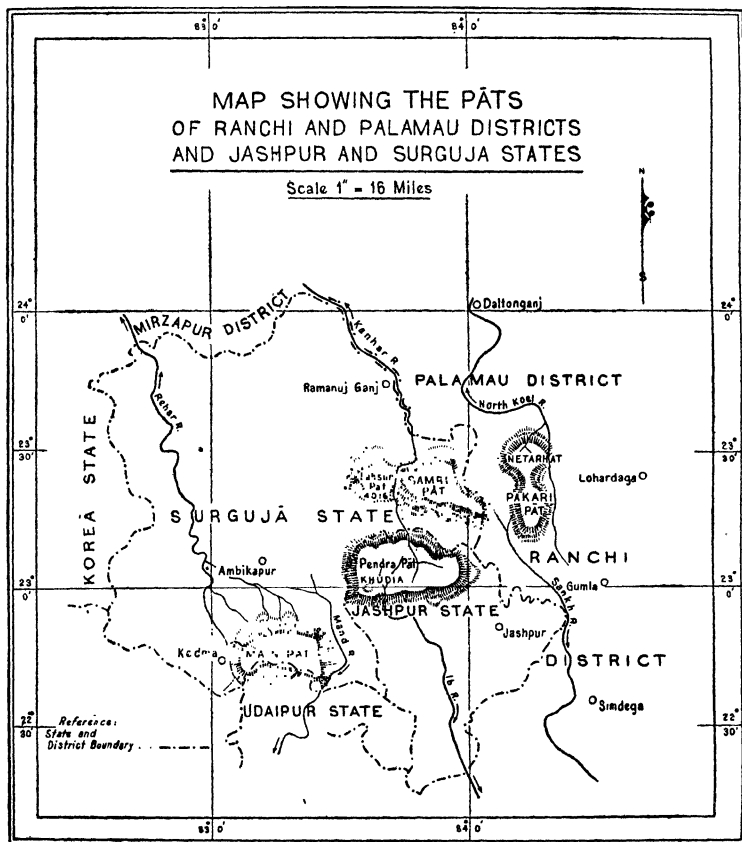
1. The climate of the *pāts* is fairly dry by comparison with that of the mountains of Orissa, the Eastern Ghats and Bailadila Hill in Bastar State, which the writer has also examined. The rainfall is about 55–65 inches compared with 75–85 inches in these places and even as much as 100 inches on the Kalahandi plateau. These drier climatic conditions are reflected in the vegetation and particularly in the scarcity of evergreens and epiphytic orchids, *Dendrobium* being the only genus at all well represented. *Strobilanthes*, apart from *S. auriculatus*, are absent; and even this latter species is not abundant. *Euphorbia prolifera* and possibly *Plectranthus ternifolius* are thought to be indicators of moderately dry and at the same time somewhat cool conditions; while *Pyrus Pashia*, *Crataegus crenulata*, *Pygeum Andersoni*, two *Rubus* spp., two *Potentillas*, *Plantago major*, *Ranunculus pennsylvanicus*, *Berberis asiatica* and *Hypericum Gaitii* reflect climatic conditions of a mild subtropical or almost temperate character.

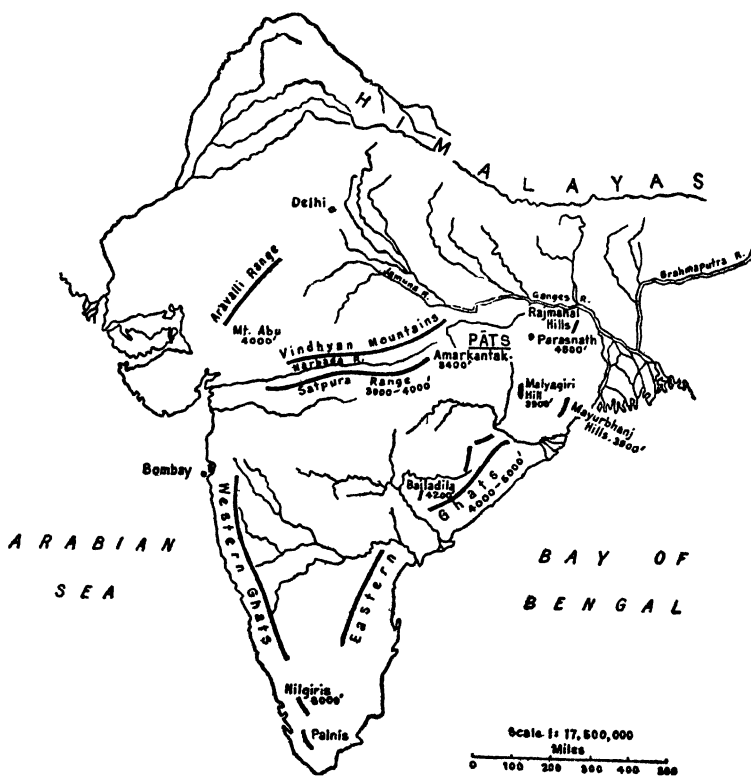
2. The climatic climax is undoubtedly sal forest of the 'Moist Peninsular High-level' type (H. G. Champion, *Ind. For. Rec.*, Vol. XIX, iii (Silv.), *Regeneration and Management of Sal*, 1933, p. 120). In his *Preliminary Survey of the Forest Types of India and Burma* (*Ind. For. Rec. (Silv.)*, 11, 1936), Champion includes this type in his 'Montane Subtropical Forests' under the subtype 'Central Indian Subtropical evergreen forest' (*loc. cit.*, p. 195). I feel that the title 'Central Indian Subtropical hill forest' would be more appropriate in our area, as the evergreen element is not much in evidence.

3. The grassland is a subseral condition brought about by shifting cultivation and maintained as a proclimax by grazing, fire and, to a lesser extent, by frost and high winds.

4. This grassland would revert to forest within a measurable period of time if the grazing and fire factors were eliminated.

5. There is no evidence which induces me to believe that evergreen forest would intrude, even with the removal of the existing adverse factors; but the possibility that a few small communities of evergreen species might ultimately appear in the moister glens cannot be entirely ruled out. It is believed that such communities, should they become established, would take the form of small *societies*.





Map showing the Pāts in relation to other mountain ranges.

Anatomical Studies on Indian Plant Galls—Part II.¹

By R. D. SAKSENA.

(Communicated by Dr. K. P. Biswas.)

In this part I give brief accounts of the anatomical characters of some more common plant galls from India. Descriptions given here are based on slides prepared by Mr. M. S. Mani; the microphotographs were also taken by him.

HELMINTHOCECIDIA.

Family MALVACEAE.

***Hibiscus esculentus* Linn.**

Gall No. 288 on roots by *Heterodera radicolica* (Gr.).²

Heterodera galls usually form on the roots and other underground parts of various plants, including several species of valuable cultivated ones. They are generally nodular or tubercular swellings, varying in size from a few millimeters to about 45 mm. in diameter.

Anatomy of *Heterodera* galls on various plants have been more or less extensively studied by several workers like Frank,³ Goodey⁴ and Marciniowski.⁵ Practically nothing is however known about the anatomy on any Indian species of plant. I deal with the structure of the root gall of *Hibiscus esculentus* Linn. as a type of the tubercular gall.

Cortex usually forms the seat of hyperplasy; endoderm absent, epidermis more or less normal. Giant cells and multinuclear cells are frequent in the gall parenchyma (Text-fig. 1), arising from the dissolution of the cell wall of adjacent cells, usually in the neighbourhood of the Nematode cysts. Epidermal cells often hypertrophied lengthwise. Large, irregular or oval chambers (Plate I, fig. 1), occurring irregularly in the gall parenchyma, enclose the female of the Nematode. The core of the vascular bundles and differentiation into regular tissues absent; the vascular bundles are irregularly scattered in the

¹ Part I of this series was published in the *J. Asiatic Soc. Bengal*, VIII, pp. 5–23, fig. 9, pls. i and ii (1942).

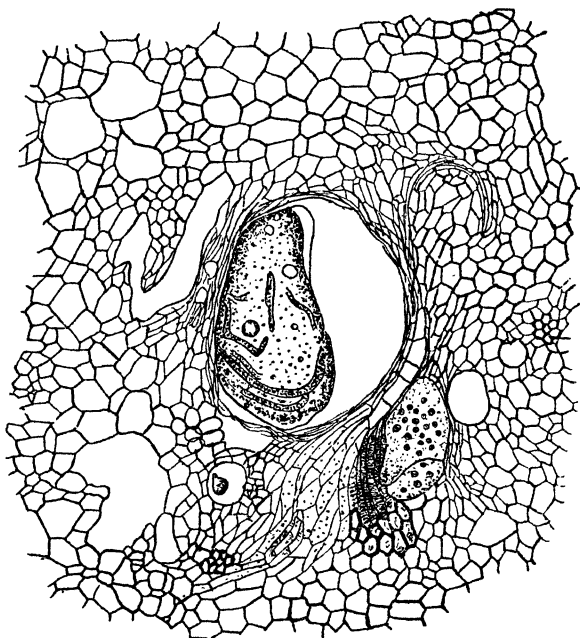
² Greeff, R., *Sitzb. Ges. Beförd. Nat. Marburg*, p. 172 (1872).

³ Frank, *Bericht. d. bot. Ges.*, II, p. 145 (1884).

⁴ Goodey, T., *Imp. Bur. Agric., Parasitol.*, St. Albans, p. 34 (1933).

⁵ Marciniowski, K., *Arb. biol. Anstalt Land. u. Forstw.*, VII, pp. 1–192 (1909).

gall parenchyma and have relatively more numerous xylem vessels. Due to cambial and medullar cell proliferation the



TEXT-FIG. 1. Part of a transverse section of root gall No. 288 on *Hibiscus esculentus* Linn. by *Heterodera radiculicola* (Greeff) (under high power), showing the large oval chamber with the female of the worm, giant cells, multinuclear cells and irregular infiltration areas.

individual vessels of a bundle often get separated by several layers of parenchyma cells.

ACAROCECIDIA.

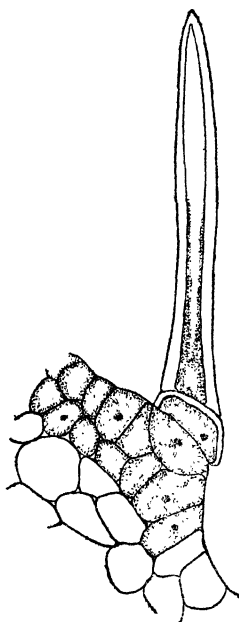
Family CONVULVULACEAE.

Ipomoea pestigridis Linn.

Gall No. 26 on stem by *Eriophyes* sp.

Irregularly tubercular, parenchyma galls on branches, petioles, etc., about 30 mm. in diameter. Epidermal cells greatly hypertrophied and rounded but distinct from the inner parenchyma cells. Trichomes rather very sparse and of one or two cells—a basal short, broad cell and a long, pointed apical

cell (Text-fig. 2). Cells of the cortex alone undergo proliferation. Cells of gall parenchyma relatively smaller. In old galls second-



TEXT-FIG. 2. Part of the epidermal layer of cells of the gall No. 26 on *Ipomoea pestigridis* Linn. by *Eriophyes* sp. (under high power), showing one of the trichomes.

dary vascular bundles arise and later establish connection with the primary vessels of the main stem (Plate I, fig. 2).

ENTOMOCECIDIA.

Family LEGUMINOSEAE.

Sub-family Mimosoideae.

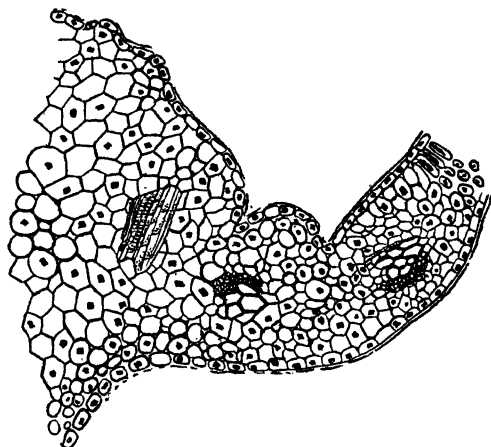
Acacia leucophloea Willd.

Gall No. 38 on flowers by *Thilakothrips babuli* Ramakr.

Cortex of the floral axis as well as the parenchyma of the floral leaves undergo cell proliferation and simple hypertrophy (Plate I, fig. 3). Essential organs do not develop. Cuticle and epidermis remain normal. Veins degenerated with the vessels irregularly scattered in the gall parenchyma. Cells of gall parenchyma relatively larger. More or less extensive fusion of floral leaves, especially at the base takes place.

Gall No. 39 on leaf bud by *Thilakothrips babuli* Ramakr.

Leaves imbricated into rosette-like galls, with the leaflets thickened, enlarged (Plate I, fig. 4), twisted and rolled into a complicated mass. Cell proliferation in mesophyll and to some extent in the cortex of the rachides also. Galled leaves entirely parenchymatous, without differentiation into palisade



TEXT-FIG. 3. Transverse section of gall No. 39 on *Acacia leucophloea* by *Thilakothrips babuli* Ramakr. (under high power), showing the typically undifferentiated parenchyma containing tanin precipitates.

and spongy tissues (Text-fig. 3). Epidermal cells relatively larger, taniniferous; stomata wholly absent on both sides of the galled leaf. Gall parenchyma cells relatively larger, more closely arranged with relatively fewer intercellular spaces. Veins irregularly scattered in the gall parenchyma and frequently hypertrophied.

Family COMBRETACEAE.

Terminalia catappa Linn.

Gall No. 41 on leaf by a new species of Thrips.

Epiphyllous marginal rolls of leaves, towards the mid-rib (Plate I, fig. 5), with the lamina twisted, thickened and spirally coiled and tuberculated. Veins and partly the mid-rib swollen due to critical hypertrophy. Mesophyll completely hypertrophied or proliferated, without tissue differentiation, especially towards the margin of the blade (which lies innermost in the gall). Epidermal cells relatively larger; stomata undeveloped on both sides. Occasionally a row of subepidermal cells have

the walls cellulose thickened on the inner surface of the gall. Ducts normal.

***Terminalia arjuna* W. & A.**

Gall No. 66a on leaf by *Trioza fletcheri minor* Craw.

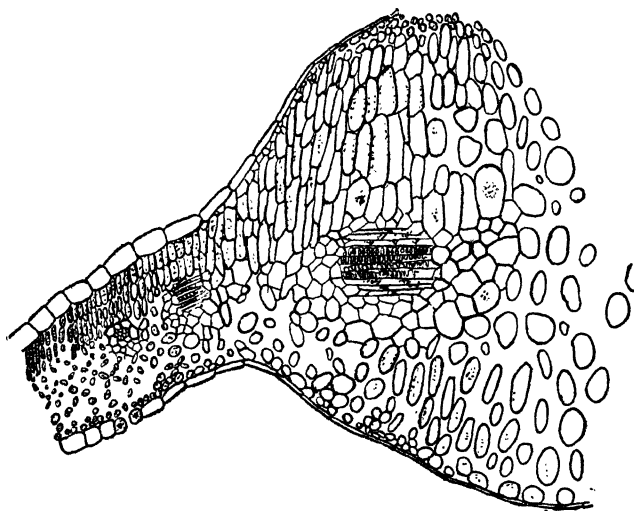
Epiphyllous beutelgall, with typically hypertrophied mesophyll; near the rather large larval chamber (Plate I, fig. 6). The cells undergo proliferation and are extremely small. The four or five stairs of palisade of the normal leaf become increased to ten in the galled portion, with a tendency for each cell to elongate very much. Epidermis normal but for the complete absence of stomatal apparatus. Vascular elements irregularly scattered in the gall parenchyma. Tanin precipitates found mainly in epidermal and subepidermal cells. Ducts normal.

Family APOCYNACEAE.

***Alstonia scholaris* R. Br.**

Gall No. 73 on leaf by *Pauropsylla tuberculata* Craw.

Epi- or hypophyllous, subcylindrical parenchyma gall; palisade and spongy parenchymae extremely hypertrophied



TEXT-FIG. 4. Vertical section of leaf gall No. 37 on *Alstonia scholaris* R. Br. by *Pauropsylla tuberculata* Crawford (under low power), showing the gradual hypertrophy of the palisade and spongy parenchymae.

(Plate I, figs. 7 and 8) with relatively mere numerous cells; stomata absent, epidermis otherwise normal. Cells at the apex of the gall relatively longer than in the deep interior below. Gall cavity without epidermis. Intercellular space present on the spongy side of leaf but absent on the palisade side (Text-fig. 4). Veins completely disorganised, with the vessels irregularly scattered in the gall parenchyma. Ducts not found.

EXPLANATION OF PLATE.

- FIG. 1. Part of a transverse section through Helminthoecidium No. 288 on root of *Hibiscus esculentus* Linn., showing on the left a portion of a normal root and on the right the galled part with three cysts of the Nematode.
- FIG. 2. Part of a transverse section of the Rindengall No. 26 on a stem of *Ipomoea pestigridis* Linn. by *Eriophyes* sp. showing the parenchymatous lobes with the newly forming secondary vascular elements.
- FIG. 3. Part of a longitudinal section of a flower gall No. 38 on *Acacia leucophloea* Willd. by *Thilakothrips babuli* Ramakr. showing the undeveloped floral envelopes.
- FIG. 4. Transverse section of bud gall No. 39 on *Acacia leucophloea* Willd. by *Thilakothrips babuli* Ramakr. showing the hypertrophy of leaflets.
- FIG. 5. Transverse section of leaf-roll gall No. 41 on *Terminalia catappa* Linn. by Thrips sp.
- FIG. 6. Vertical section of leaf gall No. 66a on *Terminalia arjuna* W. & A. by *Trioza fletcheri minor* Crawford, showing the gradual transition from the palisade (on the left) to the undifferentiated parenchyma and the capacious larval chamber.
- FIG. 7. Vertical section through the gall No. 66a showing the undifferentiated parenchyma in the margin of the ostiole.
- FIG. 8. Vertical section of the leaf gall No. 73 on *Alstonia scholaris* R. Br. by *Pauropsylla tuberculata* Crawford, showing the enormously hypertrophied mesophyll.

(All figures under low power.)

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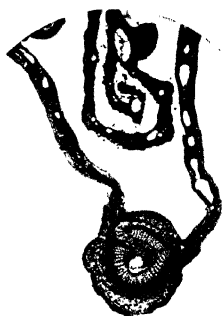
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Historical and Archaeological Secretary:—Dr. B. C. Law, M.A., B.L., Ph.D., D.Litt., F.R.G.S., F.R.A.S.B.

Medical Secretary:—Dr. J. B. Grant, M.D., M.P.H., F.A.P.H.A.

Library Secretary:—Dr. R. C. Majumdar, M.A., Ph.D., F.R.A.S.B.

Other Members of Council

L. R. Fawcett, Esq., C.I.E., I.C.S.

Dr. Sunder Lal Hora, D.Sc., F.Z.S., F.R.S.E., F.N.I., F.R.A.S.B.

Percy Brown, Esq., M.B.E., A.R.C.A., F.R.A.S.B.

Dr. M. Ishaque, M.A., B.Sc. Ph.D.

W. D. West, Esq., M.A., F.N.I.

Mr. K. P. Khartan, M.A., B.L., Barrister-at-Law.

ROYAL ASIATIC SOCIETY OF BENGAL

PRIVILEGES OF ORDINARY MEMBERS

- a) To be present and vote at all General Meetings, which are held on the first Monday in each month except in September and October.
- b) To propose and second candidates for Ordinary Membership.
- c) To introduce visitors at the Ordinary General Meetings and to the grounds and public rooms of the Society during the hours they are open to members.
- d) To have personal access to the Library and other public rooms of the Society, and to examine its collections.
- e) To take out books, plates, and manuscripts from the Library.
- f) To receive *gratis* copies of the *Journal*, *Year-book* and *Memoirs* of the Society.
- g) To fill any office in the Society on being duly elected thereto.

PROCEEDINGS OF THE ANNUAL MEETING, 1944

The Annual Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 7th February, 1944, at 5-30 P.M.

PRESENT:

DR. SYAMAPRASAD MOOKERJEE, M.A., B.L., D.Litt., LL.D.,
Barrister-at-Law, President, in the Chair.

Members :

Agharkar, Dr. S. P.	Gupta, Mr. H. C.
Asadullah, Khan Bahadur K. M.	Gupta, Mr. P. C.
Bagchi, Dr. K. N.	Haq, Khan Sahib M. M.
Biswas, Dr. K. P.	Hobbs, Mr. H.
Bose, Dr. D. M.	Hora, Dr. S. L.
Bose, Mr. M. M.	Ishaque, Dr. M.
Bose, Mr. S. M.	Jain, Mr. C. L.
Brahmachari, Dr. P.	Khaitan, Mr. K. P.
Brahmachari, Sir U. N.	Law, Dr. S. C.
Brown, Mr. Percy	Lort-Williams, Sir John
Cameron, Rev. Allen	Meyer, Miss S.
Chatterjee, Mr. P. P.	Mukherjee, Dr. J. N.
Chatterji, Dr. S. K.	Osborn, Dr. H. B.
Culshaw, Rev. W. J.	Rahman, Mr. S. K.
Dhiman, Mr. M. C.	Sarkar, Sir Jadunath
Dutt, Dr. N.	Sen Gupta, Mr. P. C.
Edgley, The Hon'ble Mr. Justice N. G. A.	Siddiqi, Dr. M. Z.
Gangoly, Mr. O. C.	Sircar, Mr. Ganapati
Ghatak, Mr. J. C.	Sukul, Mr. L.
Ghosh, Dr. P. N.	West, Mr. W. D.
Grant, Dr. J. B.	Zakaria, Mr. A. K. M.
Griffiths, Dr. W. G.	and many others.

Visitors :

Hill, Prof. A. V., F.R.S, M.P., Secretary, Royal Society.
Jayatilaka, Hon. Dr. Sir Baron, Representative of the Govt. of Ceylon.
Li, Dr. F. K. of China.
Ma Tin Nyun, representative of Princess Ma Lat.
and fifty other distinguished visitors.

The President declared the Annual Meeting open, and read the following message from H.E. The Governor of Bengal, Patron of the Society:—

‘ It is a real regret to me that I cannot be present with you this afternoon, more especially as the Royal Asiatic Society of Bengal celebrates this year its 160th birthday. I am assured that, despite the weight of its years, the Society continues energetically to pursue the course set for it by its illustrious founder,

and that it extends its enquiries with energy and zeal to whatever is performed by Man or produced by Nature within the geographical limits of Asia. I am also especially glad to hear that, in addition to its normal activities, the Society has instituted a series of Discussion Meetings for the particular benefit of members of the Defence Services, and I am confident that these meetings are a contribution to the war effort, of which the Society may justly be proud. I take this opportunity, therefore, of sending to the Society an expression of my good wishes for its future and for the successful prosecution of its work during the ensuing year, and I hope that before long I may have an opportunity of seeing personally something of this work and of meeting those who perform it.'

The President then said: 'Ladies and Gentlemen, Voting papers for the election of Council for 1944 and for the election of an Ordinary Fellow will be distributed to all the Ordinary members present. I request the Ordinary members present to put their voting papers in the collection boxes which will be sent round to them.'

After the distribution of the voting papers, the President appointed Khan Bahadur Asadullah and Dr. Suniti Kumar Chatterjee to act as scrutineers.

The President then called upon the General Secretary to present the Annual Report for 1943, who did so.

The messages of greetings were then read by:—

(1) Prof. A. V. Hill, F.R.S., M.P., Secretary, Royal Society, London, on behalf of the Royal Society. Prof. Hill presented also to the Society the autograph letters of the Prime Minister of England and of General Smuts from South Africa. (2) Dr. F. K. Li of China on behalf of the Chinese Academies. (3) The Hon. Dr. Sir Baron Jayatilaka, Kt., K.B.E., LL.D., M.A. (Oxon.), Barrister-at-Law, Representative of the Govt. of Ceylon in India, on behalf of the Govt. of Ceylon. (4) Sir Jadunath Sarkar on behalf of the Bangiya Sahitya Parishad. (5) Ma Tin Nyan on behalf of the University of Burma.

The President called on the General Secretary to read messages of greetings from other institutions and individuals.

Thereupon the General Secretary read messages of greetings received from Dr. Kunnangara, Minister of Education, Ceylon, and from the Bombay Branch of the Royal Asiatic Society of Great Britain and Ireland, and others.

The President then read his Annual Address.

After the reading of the Address, the President announced the result of the Council election.

The President thanked the Society for re-electing him as President for 1944.

The President then made the following announcements:—

1. *Election of an Ordinary Fellow.*

‘I have now the great pleasure to announce that, having received the report of the scrutineers, I declare

Dr. Girindrasekhar Bose

duly elected an Ordinary Fellow of the Society.’

2. *Elliott Prize for Scientific Research.*

The President announced that papers from two candidates had been received during the last year in competition for the ‘Elliott Prize for Scientific Research’, which was for Geology and Biology (including Pathology and Physiology). The referees to whom their papers had been sent for opinion had stated that none of them really dealt with subjects likely to ‘develop the industrial resources of Bengal, Bihar and Orissa’ in accordance with the conditions of the Prize. The Trustees concurred with the opinion of the referees and decided not to award any prize for the past years.

The prize for this year would be for ‘Mathematics’ concerning which notification had already been published in the ‘Calcutta’, ‘Bihar’ and ‘Orissa’ Gazettes.

3. *Barclay Memorial medal.*

This medal is bestowed every alternate year on a person who, in the opinion of the Council, has made conspicuously important contributions to Medical or Biological Science with special reference to India. The medal for the year 1943 is awarded to

Rai Sir Upendranath Brahmachari Bahadur, Kt., M.A.,
M.D., F.S.M.F., F.N.I., F.R.A.S.B., a former President
of this Society,

in recognition of his conspicuously important contributions to Medical Science with special reference to India.

The President presented the medal to Sir U. N. Brahmachari expressing his hearty congratulations.

4. *Sir William Jones Memorial medal.*

This medal is awarded triennially to a person who, in the opinion of the Council, has made conspicuously important Asiatic Researches, with reference alternatively to (1) Science including medicine, and (2) Philosophy, Literature and History.

The medal for 1943 was for Philosophy, Literature and History and is awarded to Sir S. Radhakrishnan, Kt., M.A., D.Litt., F.B.A., Vice-Chancellor, Benares Hindu University, for his conspicuously important researches with reference to Indian Philosophy.

The President handed over the medal to Mr. O. C. Gangoly who received it on behalf of the recipient.

5. *Indian Science Congress (Calcutta) Prize.*

This medal is awarded, whenever the Science Congress holds its annual session in Calcutta, to a person, who in the opinion of the Council, has rendered conspicuously important services to the Indian Science Congress or to a member of the Indian Science Congress who has made conspicuously important contributions to Science.

The medal for the session held in Calcutta in 1943 is awarded to

Prof. S. P. Agharkar, M.A., Ph.D., F.N.I.,

Sir Rashbehari Ghose Professor of Botany, Calcutta University,

for the important services rendered by him to the Indian Science Congress Association as its General Secretary from 1924 to 1935.

The President presented the medal to Dr. Agharkar expressing his hearty congratulations.

6. *P. N. Bose Memorial medal.*

This medal, which is to be bestowed on a person, who, in the opinion of the Council, has made conspicuously important contributions to practical or theoretical Geology with special reference to India, is being awarded for the first time this year.

The first award of this medal was made to

Sir Lewis L. Fermor, Kt., O.B.E., D.Sc., F.R.S.,

in recognition of his conspicuously important researches on the Archaean rocks of India.

The President handed over the medal to Mr. W. D. West of the Geological Survey of India and requested him to transmit it to Sir Lewis Fermor with the Society's and his hearty congratulations.

7. *Dr. Bimala Churn Law Gold medal.*

This medal was instituted in 1943 to be bestowed annually on a person who is considered to have made conspicuously important contributions to any one of the following subjects:—History, Geography, Philosophy, Religions, Ethnology, Folk-lore, Fine Arts and Architecture with reference to India, from the earliest time down to the thirteenth century A.D. and Bengali Languages, Literature and Philology.

The first award of this medal was made to

Prof. Suniti Kumar Chatterji, M.A., D.Litt., F.R.A.S.B.,
Kumar Guruprasad Singh Professor of Indian
Linguistics and Phonetics, Calcutta University

for his conspicuously important contributions to the Bengali Languages, Literature and Philology.

The President presented the medal to Dr. Chatterji expressing his hearty congratulations.

The President announced that in commemoration of the 160th Anniversary of the foundation of the Society, the following distinguished scholars had been elected Special Anniversary Honorary members of the Society:—

1. Prof. A. V. Hill, F.R.S., M.P., Nobel Laureate, Secretary of the Royal Society, London.
2. The Hon'ble Dr. Sir Baron Jayatilaka, Kt., K.B.E., LL.D., M.A. (Oxon.), Barrister-at-Law, Representative of the Govt. of Ceylon in India, New Delhi.
3. Dr. F. K. Li, Ph.D., Fellow of *Academia Sinica*, Chungking, China.

The President declared the Annual Meeting to be dissolved and invited the members to continue in the Ordinary monthly meeting for the transaction of routine business, and the visitors to inspect the exhibits in the hall.

MESSAGES.

Sir Henry Dale, President, Royal Society of London, sent the following message :

I am asking Professor Hill to transmit the cordial greetings and friendly sentiments of the Fellows of the Royal Society of London to the Members of the Royal Asiatic Society of Bengal. We have the confident hope that one of the results of Professor Hill's visit will be to strengthen the bonds of understanding and true comradeship between our Indian colleagues and the men of science of this country.

Sir Baron Jayatilaka read the following message :

I am deeply indebted to my friend Dr. Kalidas Nag, the General Secretary, for the honour of being invited to speak on this important and interesting occasion. My first duty is to offer on behalf of the Ceylon Branch of the Royal Asiatic Society and myself our hearty congratulations to the Royal Asiatic Society of Bengal on the completion of its 160th anniversary. This long lease of life which the Society has enjoyed is in itself

no small thing, testifying as it does to the continued loyalty of several generations of members. But when that long period of existence is associated with a splendid record of 'Service to truth and humanity', as your General Secretary has well-expressed it, one cannot help being filled with a deep sense of gratefulness to that great man whose genius and love of Oriental learning were responsible for the foundation of this Society, and to the distinguished scholars who in his time, and in later years, laboured in this new field revealing to the world vast literary treasures which had previously lain hidden and unexplored. I need not repeat here the various activities undertaken by the Society, and the scholars, both European and Indian, who were associated with those activities during its past history.

One important fact that should be borne in mind is that the Royal Asiatic Society of Bengal was the first institution of the kind established for the purpose of investigating the learning and the culture of Eastern lands. Even the Royal Asiatic Society of Great Britain came into being some forty years after the foundation of the Bengal Royal Asiatic Society. It has also been the precursor of similar Societies in India and elsewhere. One of these Societies is the Ceylon branch of the Royal Asiatic Society, founded a century ago. I have had the good fortune of being a member of this Society for about forty years, and also the honour of being its President for about four years. I am therefore in a position to testify to the very large amount of valuable research work the Ceylon Society has done in the field of history, language and literature, customs and traditions of the Island.

I would take this opportunity to refer to what I consider a matter of great importance, especially to scholars and peoples inhabiting the Buddhist lands in South-Eastern Asia, such as Ceylon, Burma, Siam, Cambodia, etc. This morning I was told by Dr. Kalidas Nag that your Society had in its possession a large collection of Burmese manuscripts brought from Burma seventy or eighty years ago, and also a small number of Sinhalese manuscripts. These documents have lain all these years without being examined to find out what they contained. In Ceylon, too, in temple libraries and in private possession, there are numerous manuscripts which have not yet seen the light of day. In these circumstances, would it not be possible, I ask, for this Society to initiate co-operation with the Royal Asiatic Society of Ceylon so that these manuscripts may be examined, catalogued, and in the case of such of these as may be deemed worth publishing, prepared for publication? For this purpose it may perhaps be necessary to form an International Text Society. I do not propose to discuss here in detail the constitution of such a Society. It may be noted here that such an International Body exists today in the Maha Bodhi

Society, which operates successfully in the sphere of religion. I venture to think, therefore, that the formation of such a Society as I have indicated is feasible, and is likely to produce beneficial results. In that hope I would submit this proposal for the consideration of all who are interested in the cultural co-operation between India and Ceylon.

Tin Tut, Ex-Vice-Chancellor, University of Rangoon, Representative of the Government of Burma in India, Simla, sent the following message which was read by Ma Tin Nyun :

Please ask Princess Malat to deliver the following message to the Royal Asiatic Society on my behalf: 'I know that all past and present members of Rangoon University will join me in expressing our admiration of great work done by your Society and in offering our congratulations and best wishes on its 160th Anniversary.'

Sir Jadunath Sarkar, Kt., C.I.E., Hony. D.Litt., Hony. M.R.A.S. (Gr. Brit. and Ire.), Corresp. M.R. Hist. Soc. (England), Hony. F.R.A.S.B., Hony. F. Bombay Branch R.A.S., President, Bangiya Sahitya Parisad, read the following message :

The Royal Asiatic Society of Bengal completed 150 years of its useful existence in 1934. Since then ten more years have passed, and these last years have seen great tension and disturbance in the political, economic and social fields, but during them your Society has continued to pursue its career of useful activity with no less but greater vigour. The Bangiya Sahitya Parisad, as a Society for the promotion of Indian studies in literature, language, history and sociology and other sciences through the medium of the Bengali language, has now completed 50 years of its own life, and begs to offer to the Royal Asiatic Society of Bengal its felicitations and thanks as to a parent.

Mr. Chu Chia-Hua, President, Academia Sinica, Chungking, China, sent the following message :

I have the pleasure to inform you that Dr. Li Fang-Kwei, a distinguished Fellow of our Institute of History and Philology, is bringing to you the greetings and congratulations of the Academia Sinica on this auspicious occasion of the 160th Anniversary of your honoured Society.

On behalf of the Academia and on behalf of Chinese scholars in general, may I also wish you success in your great contributions to the world's treasure of knowledge, and to express to you the great interest and admiration that our scholars have always taken in your learned endeavours. We hope that Dr. Li's visit

on this occasion will serve to bring us together even closer than it has hitherto been possible for us to be and that our common faith in the power of pure unbiased knowledge in bringing about better world understanding and permanent world peace will continually receive demonstration and support.

Mr. Chu Chia-Hua, Chairman of the Board of Directors, Sino-Indian Cultural Society in China, Chungking, China, sent the following message :

On behalf of the Sino-Indian Cultural Society in China I wish to send you through Dr. Li Fang-Kwei our sincere greetings on the occasion of the 160th anniversary of your honoured Society. We congratulate you on the brilliant record of your research in the past, and we hope that in the future your contributions to the study of Asiatic culture will be crowned with ever greater success.

The Royal Asiatic Society, Bombay Branch, sent the following telegram :

Warmest felicitations. 160th Anniversary. Our senior society ever young and active. Pray long career of continued success in cultural mission.

Mr. C. W. Kannangara, Minister for Education, Ceylon, sent the following message :

Visited the Royal Asiatic Society Headquarters of Bengal on the kind invitation of Dr. Kalidas Nag, the General Secretary. I am glad that my visit coincides with the one hundred and sixtieth anniversary of the Society. The Royal Asiatic Society of Ceylon is a branch of the R.A.S. of London, which I am informed, was inaugurated by one who had been the prime mover of the parent society of Bengal. Therefore, as representing the Ceylon Society, I wish the grand-parent Society, many more years of useful service in reconstructed India, holding its rightful place in the Great Commonwealth of the Free Nations of the world.

Dr. P. E. Pieris, Honorary Secretary, Royal Asiatic Society, Ceylon Branch, sent the following message :

Your letter of 1st February inviting this Society to send a delegate to take part on the 7th in the celebration of the 160th Anniversary of the foundation of the Royal Asiatic Society of Bengal, only arrived on the 8th instant; however, Sir Baron Jayatilaka, who it was understood would be present on the occasion, had been already requested to convey this Society's felicitations, if the opportunity occurred. Our then

President was present at your 150th Anniversary, and I am now instructed to convey to you our best wishes on the present occasion; your Society has taken the lead in opening many fields of knowledge in the past and we are confident that with increasing opportunities your contribution will, if possible, be even greater in the future, to the advantage of a world now fully alive to the need of understanding the East.

Prof. A. V. Hill sent the following letter to Dr. S. P. Mookerjee, President of the Society, enclosing the letters of Mr. Churchill and Gen. Smuts, presented to the archives of the Society :

You will probably have heard that at the Special Meeting of the Royal Society held here in Delhi yesterday before the inauguration of the Indian Science Congress I read letters of greeting to Indian scientific men from Mr. Winston Churchill and Field Marshal Smuts. I thought it might be of interest to people in India to keep the originals of these letters, and after enquiring from several colleagues it was suggested that the Royal Asiatic Society of Bengal would be the most suitable body to keep them in its archives. I send them, therefore, to you herewith with my compliments to the Royal Asiatic Society of Bengal.

Professor Saha has told me about the arrangements he has made for my visit to Calcutta during the first week of February and of the invitation to deliver on the 3rd of February the Sir William Jones Memorial lecture on 'the Royal Society'. I am very honoured by the invitation which I have told him I accept gladly. I would mention in my talk that I have given you the originals of these two letters, which I hope will be of interest to your Society.

10 DOWNING STREET,
WHITEHALL.
October 30, 1943.

DEAR PROFESSOR HILL,

I am very glad to have the opportunity to send through you my greetings and good wishes to Indian men of science and especially to the six Indian Fellows of the Royal Society, of which I am honoured to be myself a Fellow.

It is the great tragedy of our time that the fruits of science should by a monstrous perversion have been turned on so vast a scale to evil ends. But that is no fault of science. Science has given to this generation the means of unlimited disaster or of unlimited progress. When this war is won we shall have averted disaster. There will remain the greater task of directing knowledge lastingly towards the purposes of peace and human good. In this task the scientists of the world, united by the bond of a

single purpose which overrides all bounds of race and language, can play a leading and inspiring part.

Yours very sincerely,
WINSTON CHURCHILL.

Professor A. V. Hill, O.B.E., F.R.S., M.P.

SOUTH AFRICA HOUSE,
TRAFALGAR SQUARE,
LONDON, W.C. 2.
26th October, 1943.

DEAR PROFESSOR HILL,

I am much interested to hear of your coming mission to India, and feel certain that you will be able while there to place your large and varied scientific experience at the disposal of the Government and other organisations in all matters in which science plays a part. There as elsewhere scientific research in relation to industry, agriculture, war and in other directions is of paramount importance, and you will find a rich field for your knowledge and energy.

I am specially interested to know that you will probably attend a meeting of the Indian Science Congress, and will also act on behalf of the President of the Royal Society in admitting to the Fellowship of the Society a number of distinguished Indian scientists. As a past President of the parent British Association for the Advancement of Science, and a senior Fellow of the Royal Society I should like to express through you my congratulations and cordial good wishes to these gentlemen on their becoming members of the greatest and most famous scientific society in the world.

In the great forward movement of India in our day, which is so universally acclaimed, there is nothing more outstanding than the part her sons are taking in science and scientific research, and some of the most notable advances in physics, mathematics and the biological sciences have come from Indian workers. Among them the names of our Indian F.R.S.'s—Raman, Saha, Sahni, Krishnan, Bhabha, and Bhatnagar are known over the whole world of science and have added lustre to India even outside the domain of science. It is therefore fitting that your scientific mission of goodwill should also be the occasion of honouring these scientific sons of India and conveying to them the congratulations of the whole scientific world.

With all good wishes,

Ever Yours sincerely,
J. C. SMUTS.

Professor A. V. Hill,
The Royal Society,
Burlington House,
London, W. 1.

ANNUAL ADDRESS, 1943-44.

LADIES AND GENTLEMEN,

In accordance with long-established custom it is now my privilege to address the Annual Meeting of the Society and to accord our cordial welcome to all members and well-wishers who have gathered here this afternoon. We have amongst us two distinguished guests whose presence we greatly value. Prof. Hill has brought with him a special message of good wishes from the Royal Society of London. The mission that has brought him to India is closely associated with the work which this ancient Society has accomplished for generations past. I sincerely trust that his visit will be followed by a well co-ordinated and effective policy of collaboration between men of science in India and the State resulting in rapid scientific progress and economic and industrial development of this great country. We have also amidst us today a distinguished representative from China, Dr. Li Fang Kuei, who has come to Calcutta with messages of greetings from the Academia Sinica and the Sino-Indian Society to our Society, thus forging another link of fraternity between two ancient civilizations which have lived from time immemorial as friendly neighbours, each influencing the other with the fruits of its imperishable genius.

The Society completes this year the 160th year of its existence. Its illustrious founder, Sir William Jones, was actuated by a passionate zeal for the advancement of knowledge and he saw, with the vision of a seer, the manifold opportunities for original investigation and research open to scholarly men, specially those from the West who came to serve their careers in India whether in the sphere of official administration or of commercial enterprise. He placed before his contemporaries and his successors for all time to come a magnificent but most ambitious ideal for unfolding the culture and civilization of Asia, making Calcutta a living centre of Asia's intellectual activities. The memorable words that he then uttered amply bear a repetition after 160 years, serving as they do to enable us to take stock of our achievements and to remind us of the unlimited field that yet remains to be covered before our founder's ideal can be worthily attained.

Defining the object of the Society being to enquire into the history and antiquities, arts, science and literature of Asia, Sir William Jones proceeded as follows:—

‘You will investigate whatever is rare in the stupendous fabric of nature; will correct the geography of Asia by new observations and discoveries; will trace the annals and even traditions of those nations who, from time to time, have

peopled or desolated it; and will bring to light their various forms of government, with their institutions, civil and religious; you will examine their improvements and methods in arithmetic and geometry—in trigonometry, mensuration, mechanics, optics, astronomy and general physics; their systems of morality, grammar, rhetoric and dialectic; their skill in surgery and medicine, and their advancement, whatever it may be, in anatomy and chemistry. To this you will add researches into their agriculture, manufacture, and trade; and, whilst you enquire into their music, architecture, painting, and poetry, will not neglect those inferior arts, by which comforts and even elegances of social life are supplied or improved.'

To give emphasis to these details, Sir William Jones added:

'If now it be asked, what are the intended objects of our enquiries within these spacious limits, we answer, Man and Nature: whatever is performed by the one, or produced by the other.'

Himself a scholar deeply versed in Western and Eastern languages and schools of thought, the clarion call given by Sir William Jones was responded to by generations of scholars and administrators, some of whom held the highest offices both under the East India Company and the Crown. One has to turn the pages of the Society's Proceedings and Journals during the last one century and a half and one is struck by the manner in which knowledge spread in various branches of history and antiquity, language and philosophy, science and medicine. In fact, the pioneer work of stimulating original investigation in both letters and science, since the advent of British rule in India, stands to the credit of our Society. It was at first conspicuously served by Western scholars, some of whom, after their retirement from India, went back to their native land and carried on their activities in furtherance of the cause of learning. The encouragement given to the cause of Asiatic research, with special reference to Indian culture and civilization, kindled the intellectual powers of many a brilliant Indian scholar of repute, thus coinciding with the movement of progressive expansion of Western education in this country. The history of our Society indeed records India's solid contributions to the progress of human civilization. I cannot but here stress a characteristic feature of our activities. The men who have come to our Society from generation to generation have belonged to various races and schools of thought, some of whom have had sharp differences in opinion and outlook amongst themselves, others following occupations widely divergent in character; but when they came into the rooms of the Society they left behind them all extraneous controversies and differences and were actuated by one common ideal and that was how best to stimulate the intellectual activity

of the country and to glorify the sacred traditions of truth and knowledge. Historically speaking, our Society, which was unique of its kind at its inception, gradually witnessed the formation of other learned bodies and institutions devoted to specialized research in particular branches of knowledge, some of whom were the direct outcome of the 'mother' Society's efforts. Calcutta and Bengal thus became the seat of the Indian Museum; the great scientific Services organized by the Government of India, Geological, Botanical and Zoological; a vast and progressive teaching and research university; the All-India Institute of Hygiene and Public Health; the Indian Association for the Cultivation of Science, a fine achievement of non-official efforts in the field of scientific education; the Indian Science Congress and the National Institute of Sciences; the Bose Institute; the Visva-Bharati, the international university embodying the idealism of Rabindranath Tagore and various other institutions. Similar intellectual activities also spread in other parts of India affecting the domains of both arts and sciences and Indian scholars have deservedly earned recognition throughout the civilized world.

Notwithstanding such a natural development of India's intellectual and cultural life, there still remains a paramount need of a Society such as ours. In the first place, it continues to afford a meeting-ground of scholarly men, old and young, wholly engaged in the pursuit of knowledge, following diverse branches of study in different organizations. It also brings them into contact with others who, while following administrative or business careers or belonging to some other learned professions, seek an opportunity not only to imbibe new ideas and knowledge but also to make their own contributions in some department or other. It is this latter class of non-specialists who have helped in no small measure to develop the love of Asiatic culture and civilization through the agency of this Society. In the second place, our Society claims to its credit a rich and valuable library divided into four sections, namely, General, Sanskrit, Islamic and Sino-Tibetan. Apart from its value as a reference and research library in various branches of indological and scientific studies, it has a particularly rich collection of manuscripts ranging from the seventh to the nineteenth century. Our total strength of manuscripts in the Sanskrit languages is about 27,000 representing a variety of subjects such as literature from the Vedic time, philosophy, law, grammar, history, geography, astronomy, mathematics, medicine, art, architecture, music, theology and religion. At least 10,000 Sanskrit MSS. still remain uncatalogued and undeciphered. Similarly, in the Islamic section we have more than 6,000 manuscripts ranging from the twelfth century to the nineteenth, covering an equal variety of subjects. Some of the manuscripts apparently formed part of the rich collections of Mughal Emperors whose autograph they bear.

More than 1,200 Islamic manuscripts still remain to be catalogued. Our collection of coins, from the early Hindu to those of Indo-Moslem rulers, numbers about 20,000; but this section has not developed on account of the policy adopted by the Society, nearly forty years ago, to hand over its coins to the Indian Museum. Our collection of copper-plates, numbering 40, ranges in date from the third century to the eighteenth and some of them constitute important landmarks of Indian history. During the last two years we have carried on with vigour and earnestness our scheme of completing the catalogues of our manuscripts without which deeper investigation can hardly be undertaken. Many of our rare collections have been removed from Calcutta due to war emergency and our task of reorganization will not be fully completed until the return of normal times. In any case if the Society is to do full justice to its large and valuable collections, it must be enabled to engage an adequate band of scholars and experts who will develop a well co-ordinated plan of translating, editing and publishing special memoirs on the rich treasures that the Society possesses. It is thus and thus alone and not by merely making the Society a storehouse of antiquities that we can worthily contribute to the advancement of knowledge. Our publications, including our Proceedings, Memoirs and Journals, suffered for some time for lack of proper publicity. The recent catalogue brought out by the Society has promptly demonstrated the keenness of the demand for our publications from scholars far and near. We are thankful to Government for the modest grant they have made for publishing our catalogues and manuscripts. The funds at the disposal of the Society do not, however, permit it to engage a large number of scholars to develop our utilization branch. If the task is to be completed within a reasonable period of time, our funds have to be generously supplemented both by the State and the public.

In the third place, the Society, though remaining a learned one, must continue to be a well-equipped and functioning centre from where new information and knowledge may be disseminated to the public in various fields of intellectual activity, social and economic, literary and scientific. The Society by its scheme of publications and public lectures must play an important part in bringing home to the people at large the fruits of investigations of scholars and savants. Without in any way allowing itself to become a machinery for propaganda, it may thus elevate the intellect of the people it serves, broaden their minds and sharpen their curiosity. The Society readily organized special courses of Discussion Meetings, intended for civilians and members of the Allied Forces, where distinguished lecturers regularly speak in a non-technical manner on some aspect or other of Indian culture and civilization, as part of the Society's war services.

The future of the Society depends on the zeal and devotion that its members and well-wishers may bring to bear on its affairs

consistent with the great ideals of its founder. Limitless was the scope of activities propounded by him; it is for us to adjust them with due regard to our ever-changing conditions and environments. Today the war has placed human civilization on its trial. Throughout the chequered history of mankind, there have been eras of remarkable progress and achievement often mixed with tragic clashes and conflicts reviving the barbaric impulses of the jungle-man. The ancient history of the East records many an achievement of the Asiatic peoples in the domains of arts, science and religion. Indeed the greatest religious prophets of the world flooded humanity with light from the Eastern horizon. But history also records that, for centuries, the East witnessed a decay of economic and scientific progress, and it laid greater stress on philosophy and religion, on literature, art and architecture. The West illumined itself and the rest of the world by great and startling discoveries of science and it felt glorified at the apparent mastery of Man over Nature. Science revealed to the human mind the great mysteries of Nature and her infinite capacity to do good to suffering humanity. Science, however, was not permitted by man merely to serve or enlighten humanity, irrespective of race, creed and colour, but it was wedded to a policy of devastating greed and exploitation, both national and imperial, leading to distrust and conflict, and upsetting the peace and security of the world at large. The Second World War through which we are passing today, costing the lives and happiness of millions of combatants and non-combatants, will be a meaningless sacrifice unless the peace that follows it is based on fundamental ideals of equality, justice and liberty. A war to end war there may never be. But is a peace to end war beyond the contrivance of mortal thought? The safety of the world lies in the elimination of ideas of the ever-expanding spirit of material conquest and of domination and exploitation of one race or country over another. The world is large enough for all of us to stand by the maxim—*live and let live*—and to inaugurate the establishment of a confederation of free countries, each having the liberty to develop itself on the basis of its own culture and traditions and contributing its share to the spirit of Man which recognizes no barrier of race, religion or colour. Every country must learn the supreme value of giving all possible scope to its scholars and thinkers, men of letters and science, who will not allow their intellect and freedom of thought and opinion to be sacrificed at the altar of State politics. The greatest antidote for tyranny is a powerful and fearless public opinion which scrutinizes men and things from a detached point of view and speaks with knowledge and authority whenever the occasion demands it. This Society, unique of its kind, has striven to embody within itself the best that the West and the East can give and on this synthesis the future happiness and security of the world will ultimately depend. India will have

to pass through her period of post-war reconstruction and this Society will, I hope, be enabled to play its appropriate rôle. Bearing in mind the soul-stirring words of our illustrious Founder, let us march along the path of truth and knowledge and contribute to the best of our ability to the growth of that unity in diversity, that spirit of mutual respect, trust and understanding among individuals and nations which must form the foundation of a new world-order dedicated to the cause of progress of human civilization.

CALCUTTA,
7th February, 1944.

SYAMA PRASAD MOOKERJEE.

THE ROYAL SOCIETY.

Address delivered by Professor A. V. HILL, M.P., F.R.S., Secretary of the Royal Society, on the 3rd of February, 1944, on the occasion of the 160th Anniversary of the Foundation of the Royal Asiatic Society of Bengal, by Sir William Jones.

I am very honoured by the invitation to give before the Royal Asiatic Society of Bengal, on the 160th Anniversary of its foundation, the memorial lecture to that great man—Sir William Jones, the founder of the Society. I am not, alas, an historian or scholar, but I know—or think I know—that the Royal Asiatic Society is the oldest learned society in the East and is, although seemingly still in the hey-day of its youth and strength, the parent and grand-parent of many of the scientific societies in India: of three of which, the Indian Science Congress Association, the Indian Academy of Sciences at Bangalore and the Physiological Society of India, I am now proud to be myself an honorary member. If I am ignorant of history and literature it is an intellectual ignorance only, an incapacity of my conscious brain to function adequately in those fields: for emotionally I have a deep sense of these things, a reverence for the memorials and records of human struggles, aspirations and achievements in the past and an admiration for those who can themselves contribute to and appreciate these great branches of knowledge.

This apology is the more necessary because my time has been so full since I received the invitation to give this lecture that there has been little opportunity either to look up the history of the subject of my talk or to learn something more closely of the founder of your Society. You have asked me to speak about the Royal Society, 'The Royal Society of London for Improving Natural Knowledge' to give it its full title. The subject should be easier than most because I have a long connection with the Society, but I have had no books of reference by me and most of what I have to say must come from memory.

It happens that I am a member of various learned bodies of considerable antiquity. Some years ago I attended the 600th Anniversary of the Foundation of King's Hall which was one of the Colleges from which later Trinity College, Cambridge, was formed. More recently I attended the 400th Anniversary of the Foundation of King's College, Cambridge. The American Philosophical Society 'held in Philadelphia for improving useful knowledge' celebrated its 200th Anniversary last year. The Ordnance Board, of which I am an Associate Member, can be traced back directly to a founder who fought

at Agincourt in 1415. All these and many other such connections with our forefathers give one a solid feeling of reverence and pious satisfaction when one thinks how well those great men of distant days laid the foundations for their successors. Of none of these societies is that more true than of the Royal Society which was given a Royal Charter by King Charles II in 1662. Indeed a list of its first and early Fellows, containing such names as Christopher Wren, John Evelyn and Robert Boyle, 'the father of chemistry and the brother of the Earl of Cork', even today provides a source of admiring study to those who have the time and the capacity for contemplating the origins of our modern science.

I suppose that no learned academy in the world can boast of a longer continuous existence than the Royal Society. At its foundation it obtained not only a Royal Charter from the King but also a silver mace which is still placed in front of the President when the Society or its Council meets: though at present for safety it is hidden far away. It owns a Charter Book in which the Charter is written, followed by the signature of practically all its Fellows from the start to the present day. Although a Royal foundation the Society is in no way a State institution or a Government body. Its business is in the hands of Officers and Council elected by its Fellows. Its Fellows are nominated by the Council and elected by the body of Fellows themselves. It receives no subvention from the Government apart from the grant of free accommodation at its present home at Burlington House, Piccadilly. Such monies as it receives from Government are expended in promoting science, in assisting other learned societies, in aiding scientific publication and in promoting international congresses.

This freedom from Government control or Government subvention gives the Society a freedom of action and an independence which are denied to many national academies of science. From its earliest days, however, the advice and help of the Royal Society have been sought by the Government. Among the early Fellows were many civil servants or public officials and it was natural that they should discuss at the meetings of the Society problems related to their departments. Thus Viscount Brouncker, the first President and the holder of high office in the household of Charles II's Queen, conducted important researches in gunnery. Samuel Pepys, the conscientious servant of the Admiralty and the author of the *Diary*, sought expert advice on naval architecture and the culture of trees: both vital matters at a time when England was striving for the mastery of the seas with the resolute sailors of the Netherlands. All through its long history the Royal Society has had rather special connection with the Admiralty, and a few years ago, when at the request of the Government the Royal Society bought a ship for Oceanographic work in the western waters

of the North Atlantic and sent her to Bermuda, the Admiralty allowed our ship to 'wear' the blue ensign.

The reluctance of the State, manifested even up to the present day, to provide adequate financial aid for scientific research was an early concern of the Society. Though a considerable sum of money had been spent on the establishment of the Royal Observatory at Greenwich, founded at Charles II's instigation for 'finding the longitude for perfecting navigation and astronomy', the Government refused to provide the 'Astronomical Observer' Flamsteed with the necessary instruments. A number of Fellows of the Society came to the rescue and lent him such instruments as they themselves possessed.

The fortunes of the Royal Observatory were keenly followed by the Society and in Queen Anne's reign its President and the nominees of its Council were appointed as the 'constant visitors' to direct the scientific work of the Astronomer Royal and to advise the Government on the provision and care of instruments. This link between the Society and the Royal Observatory remains unbroken, though the constitution of the Board of Visitors has been modified.

During the greater part of the eighteenth century the Society collaborated with the Admiralty on 'the problem of the longitude'. In the closing years of the previous century Halley made two voyages to study the variation of the compass. In 1749 the Society awarded the Copley Medal—its highest honour—to John Harrison, whose skill as a maker of chronometers later earned for him rich rewards from the 'Board of Longitude'. The Society took an energetic part in the preparations for observing the transits of Venus in 1761 and 1769, obtaining from the Admiralty men-of-war for the transport of the scientific observers and from the Government substantial grants for the purpose of providing instruments and maintaining personnel.

The expedition to observe the transit of Venus in 1769 was led by Lieutenant, later Captain, James Cook, R.N., who already enjoyed a high reputation for the accuracy of his survey of the St. Lawrence river in Canada. He was accompanied by the astronomer Charles Green and together they tested successfully the new system of fixing a ship's position by direct daily observations. After the observation at Tahiti of the transit of Venus Captain Cook, in accordance with his sealed orders, turned his ship, H.M.S. *Endeavour*, southward to search for 'the continental land in the South Pacific', which many sailors and scientists were convinced existed in the higher latitudes here. Cook's use of the new navigational methods enabled the *Endeavour* to shape her course with an accuracy unknown to the older school of navigators.

Though Cook himself was convinced that 'the so-much-talked-of Southern Continent' did not exist, the Admiralty with the concurrence of the Society organized two further

expeditions under Cook's leadership finally to clear up the mystery. It was during the voyage of 1772-5 that Cook was convinced that he had found a cure for scurvy—the disease which decimated and more than decimated ships' companies in the 18th century. This was the first discovery of vitamins. The Society admitted him into the Fellowship in 1776 and in the same year awarded him the Copley Medal for his account of the precautions taken to preserve the health of his men; only one of them died of scurvy during the three years' voyage.

During some of Cook's voyages he was accompanied by Sir Joseph Banks, who afterwards for more than 40 years was President of the Society. Banks was an ancestor of the late Lord Brabourne whose family still preserves Banks' diary. The Society owes much to Banks, but his long presidency must in the end have become a tyranny, for after his death it was decided that no President should remain in office in future for more than five years. In more recent times Sir Michael Foster, Professor of Physiology at Cambridge and Member of Parliament for London University, remained Secretary for a very long time and, history repeating itself, the Society afterwards adopted a standing order that no Secretary should hold office for more than 10 years. In the Society's apartments there is a famous portrait of Sir Joseph Banks, showing him with a globe of the earth. Last year by a fortunate chance this globe was found in Somerset. The Society immediately sent an agent to verify that it was the object really shown in the portrait and acquired it for £3!

I have wandered rather far from the early days, but being no historian and being without records here it would be dangerous for me to say too much. I recall, however, the early experiments made by the Society on blood transfusion and how a pint or more of blood was injected into a man. The victim chosen was 'an indigent student of divinity', who apparently was ready to earn a fee that way. He was allowed to choose the kind of blood to be pumped into him and selected sheep's blood with some reference to 'the lamb of God'. Anyhow no disaster seems to have happened and the indigent divinity student survived the ordeal. There are stories also, I know not of what substance, of how King Charles II tried to trick the Society by a question. It is said that he asked why if one filled a glass bowl to the brim with water and then put a gold fish into it the water did not run over. Apparently there was some discussion of the cause of the alleged phenomenon, but at last some follower of St. Thomas said he would like to see it for himself. No explanation was then found necessary.

One of the first Secretaries of the Society was John Wilkins, Warden of Wadham College, Oxford, later Master of Trinity College, Cambridge, and still later Bishop of Chester. Wilkins was the author of a thesis on Noah's Ark in which, accepting

completely the story in the Old Testament, he set to work to calculate the amount of food that must have been required for all the animals taken aboard that vessel. The carnivora had, of course, to live on meat and Wilkins calculated everything in wolf or sheep units. The main supply of food, if my memory serves, was hay; the sheep ate the hay and the lions, tigers and wolves ate the sheep. It is all worked out with drawings and calculations complete.

The other Secretary at the Foundation was John Oldenbourg who not having satisfactory British nationality was at one time interned when England was at war with the Netherlands—just as happened to other people in 1940. During that period a paper was published, of which he did not approve; on blood transfusion, if my memory serves. When he was let out of gaol he succeeded in recalling nearly all the copies of that paper, but one or two are still in existence as a record of his internment.

Newton, of course, was President for many years, but apparently his eminence prevented his long tenure from having the same effect as that of Joseph Banks had later. Newton was my predecessor in being Member of Parliament for Cambridge University; at the same time I believe as he held office in the Society.

The Society from its earliest days supported the view that science must be international in character. The papers of Leeuwenhoek, describing his microscopical observations on living cells, were published by the Society; and many of the early Fellows maintained a lively correspondence with foreign scientists some of whom were admitted into the Fellowship. The Foreign Membership itself was established later. In 1713 the Queen ordered 'her Ministers and Governors that go abroad' to act as the Society's correspondents and this arrangement resulted not only in the collection of a considerable body of scientific data but also in important additions to the Society's famous 'repository of rarities'. Ten years later the Council appointed an Assistant to the Secretaries to conduct foreign correspondence: he was the precursor of the Foreign Secretary, whose function it is to maintain the foreign relations of the Society.

This interest of the Society in international relations among scientific people has continued right through its history and the Society now acts to advise H.M. Government on all matters connected with international scientific congresses and gatherings, contributions to international scientific undertakings, the appointment of British members on international scientific bodies and so on. It has also always been concerned with maintaining the academic freedom of scientific men and in relieving difficulties due to international disturbances. When, for example, in 1933 academic refugees began pouring out of Germany as a result of Nazi persecution Lord Rutherford, who had earlier been President, and other Fellows of the Society,

took a very active part in founding the Academic Assistance Council in order to relieve these peoples' difficulties and distress and to enable them to continue with their work. In its early days the Academic Assistance Council had a home in the apartments of the Royal Society.

To return to earlier history, in 1750 the Society at the Government's request enquired into and found a remedy for gaol fever. Its scientific prestige did much to ensure the early passage into law of the Bill which substituted the Gregorian for the Julian Calendar (1751). It recommended Lord Baltimore and Penn to employ Mason and Dixon to settle a long standing dispute between Maryland and Pennsylvania, the result being the famous Mason-Dixon Line (1763). In 1772 it advised on the best type of lightning conductor for the protection of powder magazine, the majority, among whom was Benjamin Franklin (a Fellow of some years standing), recommended the use of the 'pointed' conductors. A protracted controversy ensued. King George III, detesting Franklin because of his championship of the cause of the American colonies, attempted to induce the Society to accept the minority recommendation of 'blunt' conductors, but the President, Sir John Pringle, reminded the King that it was not in his power 'to reverse the laws and operations of nature'. As far as the Society was concerned George III does not appear to have resented the rebuke, though he clung to his project and had 'blunt' conductors fitted to his palace. In 1784 he readily agreed to provide funds to finance a geodetic survey for the purpose of establishing a trigonometrical connection between the observatories at Greenwich and Paris in order to determine the difference of longitude. The beginning of a general survey of Great Britain was made in 1791 and the first inch-to-the-mile sheet of the Ordnance Survey maps was issued in 1801. In all this the Society played its part.

Referring back to Benjamin Franklin, it may be recalled that it was he who founded in 1743 the American Philosophical Society, the oldest learned society in America, 81 years younger than the Royal Society but obviously founded on its model. His signature occurs with others in our Charter Book and his certificate as a candidate for election always attracts American visitors when we show it at the soirees of the Society.

The Society has many records of its earlier days, including the manuscript of Newton's *Principia*, a number of his instruments, his death mask, lockets of his hair and other objects connected with him. It has also in its library the great collection of books given to it in its very early days, known as the Arundel Collection. Among these are some supremely beautiful volumes representing the earliest efforts in printing. Our library has never been really tackled by a librarian of the modern school and during the turn-out which we have been forced to make

since the war began, in order to put our valuables in safety, we have come upon a number of records, letters, etc., of the greatest interest. We intend as soon as conditions allow to make a considerable effort to ensure that our library is properly surveyed and its treasures recorded and made known. If there be any Americans in my audience today they may like to know that two years ago we found a letter from Cotton Mather of Massachusetts, thanking the President for his election. I think he must have been our earliest Fellow in the American Continent. He is said to have introduced vaccination for small-pox into America away back in the 17th or early 18th century (my memory may be at fault as to the exact time). He is certainly unique in one fact that he was the only Fellow of the Royal Society of whom it is recorded that he took a personal and active part in the burning of witches.

The library is unique in one respect: it is probably the most complete library in the world of the proceedings and transactions of learned societies, bodies and institutions. That provides it with a special rôle and we have many irreplaceable sets of journals of the other learned bodies. The value of these and of our other possessions made it necessary for us, when war came, to remove them from danger away from London, and the contents of the library have been stored either in Wales or more particularly in the very strong and safe Bodleian Library at Oxford. We have also an invaluable collection of portraits of scientific men including those of nearly all our Presidents. These also have been removed to a safe place. Some damage may result from the movement, but we should not have been justified in keeping them where they might so easily have been completely destroyed. Two and a half years ago, in fact, a very large German mine fell within 100 yards of the Royal Society's premises and many smaller ones have fallen near.

The Society has always rigorously held to the view that its function was in relation to *natural* knowledge, and it has consistently refused to consider as coming within its scope the other branches of knowledge which are dealt with by such a Society as yours. This has probably been wise, and it is certainly wise today when knowledge in all fields is growing so rapidly. At the end of the nineteenth century a strong movement was evident to get the Society to take literature, philosophy, the humanities and the social sciences also under its wings. This was resisted, and the Society took the initiative in obtaining a Royal Charter for the newly founded British Academy which was planned to do for those other subjects what the Royal Society has done for natural sciences. The British Academy has not yet achieved the position people then hoped, though it is a body of great distinction in its membership. I feel myself that it has not sufficiently realized the great need for a body of its standing to take the same active part in forwarding the interests of the

other forms of knowledge as the Royal Society has taken in respect of science.

I have several times spoken of what the Society has done in advising the Government on scientific matters, but the expression is not strictly accurate. The Society advertises in every volume of its transactions a statement to the effect that the Society as a body never expresses an opinion on any matter of art or science which is brought before it. It is always ready to nominate an expert committee to advise, but the advice is given by the committee and not by the Society as a whole. Nor in publishing a paper does it express any opinion as to the validity of the results claimed. When a paper is received, communicated by a Fellow, it is submitted to referees: if they agree that it should be published it goes to the printer, if they do not, after various precautions it is rejected or withdrawn. Often the referees have suggestions for modification. No doubt the Society, or rather its referees and its officers, occasionally make mistakes, but on the whole justice is done and a high standard is maintained in the Society's publications. Some years ago an author demanded to have his paper published without being considered by referees and I was forced to remind him that if God Almighty happened to submit a paper for publication it would go to referees in the usual way. He sent it elsewhere.

The Society's public activities in the nineteenth century covered a wide field. It impressed on the Admiralty the desirability of fitting out expeditions for polar exploration (1818-19). The geographical results obtained in 1818-19 were disappointing, but the magnetic observations of Edward Sabine, one of the Society's scientific observers, were of the greatest importance. Sabine played a leading part in laying the foundations of the science of terrestrial magnetism, which occupied the attention of the Society during the first half of the nineteenth century. Supported by the British Association it successfully persuaded the Government to finance the establishment of magnetic observatories at Greenwich and in other centres of the British Empire and during the 1840's and 50's a number of magnetic expeditions were sent out to various parts of the world in order to obtain the data for 'a magnetic map of the globe'.

Other subjects in which the Society co-operated during the nineteenth century were these: the causes of an explosion at the Westminster Gas Works; the operation of gas undertakings with special regard to public safety; measuring the tonnage of ships; the use of coal tar and copper sheathing for men-of-war; the desirability of the Treasury financing Babbage's machine for calculating and printing mathematical tables. The Society also took a prominent part in the movement which, at the beginning of the twentieth century, led to the establishment of the National Physical Laboratory, over the work of which the President and Council—through an Executive Committee

appointed by them—still exercise considerable control. All appointments to the three Government Research Councils (Scientific and Industrial, Medical and Agricultural) founded since 1914 have now to be approved by the President.

Many learned societies regard election as a kind of prize for services rendered, or a consolation prize for old age. That has never been the view of the Royal Society. The purpose in election has always been to get men in the prime of life, who by their active work, influence and interest can forward the objectives which the Society has at heart. The average age of some academics makes them useless for active work and initiative. In the Royal Society some groups are elected younger than others, but in the mathematical and physical groups the median age of election is under 40 and elections in the early thirties are frequent. The view always is that if a man is obviously worthy of election for his intellectual eminence and scientific achievement he should be elected now. Of our present 21 elections per annum, one is in the special category by which men of eminence in public affairs or distinguished in other branches of knowledge may be brought in, on the grounds that they 'either have rendered conspicuous service to the cause of science or are such that their election would be of signal benefit to the society'. Of the remaining 20, two annually are intended to be elected from among scientific men who by their work and influence as heads of big scientific undertakings, etc., have forwarded scientific knowledge otherwise than directly by their own hands. The remainder are now elected for the most part from among professional scientific men: though the first-class amateur is equally eligible.

I have said 'scientific men' and before the passing of the Sex Disqualifications Removal Act it would have been impossible, without an Act of Parliament to change the Charter, to have elected women. By that Act, however, it is now the case that 'man' includes 'woman', so that women are eligible for election. Their candidature requires only—as with men—that six Fellows should propose their names in writing. This year, for the first time, women have been proposed and one may hope that in future women will be regarded as normally eligible. There are not many women at present of the required scientific standing, but almost certainly there are some, and there is surely no reason for excluding them.

Although its title is the Royal Society of London the Society is in effect an imperial scientific body, with connections throughout the various countries of the British Commonwealth. Those connections have been greatly strengthened in recent years partly by the election of an increasing number of Fellows outside the United Kingdom and partly owing to the presence in London during the war of a large number of scientific people from the Dominions. In 1941 the Society took advantage of their

presence there to found a British Commonwealth Science Committee, which during the following 18 months held frequent meetings and discussed future collaboration in science between the different parts of the Empire. It issued its report last spring. Of the present Fellows of the Society totalling now about 450 some 10 per cent are normally resident in other countries of the Empire, though many resident now in Great Britain had their original homes in those other countries.

The connections of the Royal Society with other countries also are considerably, not least through its foreign members among whom are the most distinguished scientific men in all parts of the world. Their number is limited by statute at present to 50, though many Fellows of the Society feel that with the recent great growth in science throughout the world this number could properly be considerably increased. Foreign members are Fellows in all respects except that they do not pay subscriptions and may not vote; and the Society always hopes that they may take part in its affairs. The connection of the Royal Society with the National Academy of Science in Washington is rather close. Most of the foreign members of the National Academy are either Fellows or foreign members of the Royal Society, and more than one-third of the Royal Society's foreign members live in the U.S.A. Moreover, a few years ago the National Academy and the Royal Society arranged a plan by which in alternate years the Academy invited a Fellow of the Society to come and lecture in Washington and the Society invited a member of the National Academy to come and lecture in London. The Pilgrim Trust provided the financial means for implementing this project, which as time goes on will prove increasingly valuable to both sides. If there were in India a single national scientific body generally admitted and accepted as the National Academy of Science, the Royal Society, I am sure, would be proud and glad to collaborate with it as it does with the corresponding academies in other countries.

In 1938, a few months before the Munich crisis, the Council of the Royal Society asked its President to approach the Prime Minister of that time, Mr. Neville Chamberlain, calling his attention to two great national needs in the scientific field, in case of a national emergency which seemed then to be imminent:—

- (1) of some kind of register of scientific people by which the national services could be fed with appropriate scientific personnel;
- (2) of some kind of scientific committee to advise the Government at a high level on general scientific policy.

That was still in the days of 'appeasement' and before the need of science in the national machinery was so well recognized

as today—and nothing was done. Unfortunately in public affairs one cannot get anything done by merely saying it once. One has to go on saying it day after day until people are sick and tired of it. That is why scientific people, who like saying a thing clearly and precisely once only and leaving others to judge the validity of their claim, are often so averse to taking part in public and political affairs: indeed those scientific men who go round advertising their own wares are generally looked at askance by their colleagues. In the matter, however, of applying science to public affairs the national safety and prosperity require that one *should* go on saying the same thing over and over again until one is heard, and in the two respects just mentioned the Officers of the Royal Society and their colleagues continued to follow the matter up until both objects were finally secured.

In January 1939 the Central Register of the Ministry of Labour and National Service was instituted, by which professional, technical and scientific personnel were brought into a single organized plan to make them available if and when the emergency arrived. The Royal Society organized and carried out the construction of the part of the Central Register dealing with scientific people, with much help from other societies and institutions. Finally this was handed over to the Ministry of Labour by which it is now worked. May I here incidentally remark that one of the needs of India, now that the war will be passing eastward and in view of the great technical developments likely to occur in India in the future, is for a similar register by which the available scientific and technical talent may be made more fully and quickly available.

In the other matter, that of the scientific policy committee, nothing happened till the autumn of 1940, when the War Cabinet Scientific Advisory Committee was set up under Lord Hankey as Chairman, working under the general guidance of the Lord President of the Council. This Committee has had a considerable quiet influence in scientific developments and in helping to guide the Government scientific policy: its members are the three principal officers of the Royal Society and the three Secretaries of the Research Councils (D.S.I.R., M.R.C., A.R.C.). These two major changes, probably of permanent value in our national scientific 'set-up', arose directly through the intervention of the Royal Society and probably would not have arisen—at any rate so quickly—in any other way. This result is in accord with the historical function of the Royal Society in relation to the Government of the United Kingdom.

Another activity of the Society, again in accord with our traditional interest in international relations, arose after the sudden internment of all 'enemy' aliens in Great Britain during the summer of 1940. Among those who were thus interned were a number of able scientific people, nominally enemies, but

in fact for the most part devoted to our cause. The President of that time, Sir William Bragg, took the initiative in approaching the Home Office, and after some palaver (aided, I admit, by Questions in the House on the part of the Secretary!) the Home Office agreed to consider applications from the Royal Society for the release from internment of people with scientific attainments whose work could be valuable in one way or another to the Country. Other bodies followed suit for people in other fields of activity. Under this plan some hundreds of scientific refugees were released from internment and the Royal Society (and the Society for the Protection of Science and Learning which aided it) made many friends and got much gratitude from those whom in this way it had the privilege to aid.

One of the satisfactions of being, as I am, an Officer of the Royal Society is the unlimited friendly help one can always get from Fellows. The Society is small enough in members to be a family and most of the Fellows are eminent enough to be comparatively well known. On the Council at any time there will always be some who have personal knowledge of any Fellow named. In a family it is customary for members to help one another and that is the Character of the Society. As Secretary, I have continually had to ask help from Fellows—help often involving strenuous work of various kinds, invariably and cheerfully given. That is the virtue of a small Society of limited membership but of very high standards in election.

The functions of the Royal Society and of the British Association are quite different but complementary. They represent the two different principles required in Government and Society, that of aristocracy and that of democracy. By aristocracy is meant not what the word commonly means today—inherited wealth and opportunity—but the existence of power in the hands of the best people. In Science we know and everyone admits that one Newton, one Maxwell or one Rutherford (to take the field of physics only) is worth—scientifically speaking—ten thousand ordinary men: and it is in the frank recognition of this principle that the Royal Society maintains the highest possible standards in its annual elections. Its influence is in that sense 'aristocratic', representing the aristocracy of high intellect and attainments. The democratic idea, however, is equally important and the British Association and its corresponding bodies, such as the American Association for the Advancement of Science, or the Indian Science Congress Association, with their wide membership, have an equally important function to fulfil. In Science as in a social community the twin ideas of a true aristocracy and a genuine democracy must be combined if we are to produce an efficient, or even a workable, system.

The Royal Society has considerable funds of its own and these seem likely to increase as time goes on. Our invested funds amount at present to about one million pounds, a large

part of which are research funds for specific subjects. These funds are expended, on the advice of various committees, largely in maintaining research professors, fellows and students, but also for general purposes. The Society would like a much more spacious home than its present one, and I gather that the President in his Anniversary Address on the 30th of November last emphasized—apparently with some public approval—the need for better accommodation and premises. In Washington the National Academy of Science has a noble home on Constitution Avenue. Your National Academy of Science in India must find a home some day on Kingsway at New Delhi. It is well to treat Science with dignity, as learning in general is treated in the noble universities that we see in many countries including India. After all what is more dignified in the world than learning and knowledge—except perhaps courage and self-sacrifice!

I have talked more about the abnormal activities of the Society in times of emergency and less about its normal activities in time of peace. That perhaps is because five years of my own Secretaryship, out of the eight I have served, have been times of emergency. In ordinary times we have a variety of functions: the publication of scientific papers; the reading and discussion of scientific communications; the maintenance of a library; the distribution of funds for research, publication and the relief of distress among scientific people and their relatives; the appointment of committees to deal with a variety of subjects—oceanography, expeditions, marine biology, meteorology, neurology, international relations, medical research, tropical diseases, science in the Pacific regions, engineering and physical research, the National Physical Laboratory, eclipses, mining and a great variety of other subjects.

The Society also nominates representatives on a number of public or private institutions and so sees that Science is represented in important national or cultural interests—for example, in the British Museum, the Meteorological Office, various universities and great public schools, various research institutions, bodies and associations, several Government Departments and so on. When an international scientific occasion occurs, or when some foreign academy organizes a celebration, it is the Royal Society which sends delegates and an address to it. It also awards Medals for great services to science. The greatest scientific distinction in the world is that of the Copley Medal which is awarded 'to the living author of such philosophical research as may appear to the Council to be most deserving of that honour: no limitation being imposed either of the time within which the research was made or of the particular country to which its author may belong'.

Well, I have told enough about the Royal Society's multifarious activities and something of its past. There was a time when the Royal Society was the only learned society in the

United Kingdom: now there are a multitude of others. That, however, does not take away from, but rather enriches, the life and activities of the Royal Society itself. It is able to act as an elder-brother or sister of these newer bodies and a large family is always more interesting—if more noisy—than a small one. It is perhaps in this rôle of elder brother or sister to all these other societies that the Royal Society today finds its most pleasant and natural rôle. That is a rôle which the Royal Asiatic Society of Bengal also gracefully fulfils: all honour to its founder today!

OFFICERS AND MEMBERS OF COUNCIL.

ROYAL ASIATIC SOCIETY OF BENGAL, 1944.

*Elected and announced in the Annual Meeting,
7th February, 1944.*

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Dr. Syamaprasad Mookerjee, M.A., B.L., D.Litt., LL.D.,
Barrister-at-Law.

Vice-Presidents.

Dr. Meghnad Saha, D.Sc., F.R.S., F.N.I., F.R.A.S.B.

Dr. S. C. Law, M.A., B.L., Ph.D., F.Z.S., M.B.O.U., F.N.I.

The Hon'ble Mr. Justice N. G. A. Edgley, M.A., I.C.S.,
Barrister-at-Law.

Dr. R. C. Majumdar, M.A., Ph.D., F.R.A.S.B.

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Other Members of Council.

Dr. S. L. Hora, D.Sc., F.Z.S., F.R.S.E., F.N.I., F.R.A.S.B.

L. R. Fawcus, Esq., C.I.E., I.C.S.

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K. P. Khaitan, Esq., M.A., B.L., Barrister-at-Law.

EXHIBITION ANNUAL MEETING.

LIST OF EXHIBITS SHOWN AT THE ANNUAL MEETING OF THE
ROYAL ASIATIC SOCIETY OF BENGAL ON THE
7TH, FEBRUARY, 1944.

1. S. P. AGHARKAR.

(1) *Balanophoraceae*.

The Balanophoras are low, fleshy, leafless or scaly, brown, reddish or yellowish root parasites found in the forests of the tropics or subtropics.

Three species occurring in India are exhibited. They are: (1) *Balanophora dioica* Brown. from the Khasi Hills; (2) *B. indica* Wall. from Kodaikanal (Pulney Hills); and (3) *B. polyandra* Griff. from Sikkim.

(2) *Arceuthobium minutissimum* (Fam. Loranthaceae).

Considered to be the most minute dicotyledonous plant. The Arceuthobias are minute green leafless parasites, with the leaves reduced to opposite scales in which the very minute ebracteate flowers are sunk. There is no stem in the species exhibited, but the inconspicuous stock ramifies within the bark and which the minute branches perforate but scarcely rise above the surface, appearing as a 2 lipped cup; the male flower sessile in the cup, 3-5 partite, the female flower pedicelled. Found on trees of *Pinus excelsa* from Kumaon Himalayas and westwards to Kashmir and Nepal about 10,000'.

(3) *Himalayan Podostemonaceae*.

Podostemonaceae are a group of aquatic plants, growing on stones in rapidly flowing tropical streams, annual or perennial, many species of which are known from India. Until recently their presence from the Himalayas has not been recorded.

The exhibit shows species collected from Almora and from Sikkim.

2. PERCY BROWN.

- (1) *An exact replica in bronze of the statuette of Dionysus, the so-called 'Narcissus listening to the Echo'; the original is in the National Museum of Naples, and was discovered during the excavations at Herculaneum. As to its date it may well be one of the better examples of the survival of the Hellenistic tradition in works made during the Roman Period, i.e. previous to A.D. 79.*

As many of the institutions of Naples were destroyed by the Germans when they evacuated the city last year, it is possible that amongst these was the National Museum, in which case the unique collection of bronzes forming the archaeological collections has perished. This excellent replica in metal therefore has an added value since this wanton act of desecration may have been perpetrated.

- (2) *An example of modern wood-carving by a craftsman from Orissa—S. Mahapatra of Puri. The subject is Krishna and Radha.*
- (3) *Metal figure of the Buddha, probably from Siam previous to Sinhalese influence.*
- (4) *Copy in colours of a fresco from the National Museum at Naples of a figure known as 'Flora', from the ancient town of Stabiae at the eastern extremity of the Gulf of Naples. Period of Augustus (63 B.C.—A.D. 14).*

3. GEOLOGICAL SURVEY OF INDIA.

Specimens of galena, zinc-blende, sulphur, wolfram, mica, beryl, tantalite and thenardite.

The exhibits displayed are of minerals produced or prospected by the Geological Survey of India to help in the War effort. Particular efforts have been made to locate and develop those minerals which were urgently needed after the loss of Burma, or which could not easily be imported owing to difficulties of sea transport.

(1) *Lead and Zinc.*

Lead and zinc ores were worked around Zawar in Mewar State, Rajputana, for about 400 years. The mining ceased in the early part of the 19th century, but the reason for this is uncertain. Depredations by the Bhils is the usual reason given. This may have been the cause, but it is difficult to believe that the Maharana would not subsequently have opened valuable mines which for centuries had provided him with the sinews of war for his battles against the Moghuls and Mahrattas if there had been any prospect of their still yielding him a good revenue. Probably the value of lead, silver and zinc fell considerably in the early 19th century, and the mines by that date had reached a depth (about 300 feet) where further working without any machinery or explosives was considered to be too difficult.

The ancient village of Zawar is now in ruins. Little remains except the ancient temples built of marble, and the great heaps of earthenware pots in which the miners are reputed to have smelted zinc. Nearby great mounds of black slag show where some mineral, probably lead, was formerly smelted. In the ores now worked the percentage of silver is small, but the present Maharana is determined that silver was the chief product of the mines in ancient days. The abundance of silver necklaces of antique pattern worn by the Bhils in this region supports his view, and indeed it is very probable that the surface ores did contain this mineral in much larger amounts than are found now.

The present operations are still in the prospecting stage. So far they have shown a huge quantity of ore with 4% zinc, and a small amount of ore containing 8% zinc and 2% lead. It is hoped, however, that much larger amounts of the richer ores will be found in the course of prospecting.

(2) *Sulphur.*

Before the War India's requirements of sulphur, for the manufacture of sulphuric acid and for use in sugar refining, were obtained mainly from Italy and Japan.

It had long been known that sulphur occurred on the volcanic mountain of Koh-i-Sultan on the borders of Baluchistan and Persia, but it was not until the end of 1940 that it was shown by the Geological Survey of India that the quantity of sulphur was considerable. Mining was begun towards the end of 1941, and up to the end of 1943 over 30,000 tons of sulphur ore, containing over 15,000 tons of free sulphur, had been despatched by rail to India.

(3) *Wolfram.*

With the loss of Burma and Malaya it became imperative to try and locate sources of wolfram in India. The wolfram of Chhendapathar, in the Bankura district of Bengal, though known for many years, was never worked until the middle of 1942, when the Geological Survey of India prospected the area. The ore occurs in quartz veins in schist, but mineralization is sporadic. Up to the end of 1943 about 46 tons had been produced. Most of this has been sent to Tatanagar for the manufacture of ferro-tungsten.

(4) *Mica.*

About 80% of the world's requirements of good quality sheet mica (without which the War could not be fought) is supplied from Bihar. Smaller quantities are also mined in Rajputana and Madras (Nellore). The Geological Survey of India has helped in the production of mica from these three areas, and has its own mine and factory in Bihar.

The exhibits show the mica as it occurs naturally in the pegmatite, and the finished product as it leaves the skilled hands of the Bihari cutters and sorters.

(5) *Beryl.*

Beryllium has of late become of increasing importance in the manufacture of beryllium-copper alloys. The ability of this alloy to stand high stress has made it of particular value in the manufacture of springs, while it is also used for making non-sparking tools.

Beryl is widely distributed in the mica-bearing pegmatites of Rajputana, Bihar and Madras, and sometimes huge crystals one or two feet in diameter and several yards long are found.

It has been collected from these three areas by the Geological Survey of India for shipment to the U.S.A.

(6) *Tantalite.*

Tantalite, columbite and samarskite are rare minerals of closely related composition. The metal tantalum offers great resistance to corrosive acids, and is used in radio valves and for rectifying apparatus for the conversion of alternating into direct current.

These rare minerals have been found in small quantities in Madras, Bihar and Mysore, and particularly in Rajputana, usually in association with mica-bearing pegmatites. So far about $1\frac{1}{2}$ tons have been collected.

(7) *Thenardite (Sodium sulphate).*

Formerly nearly 2,000 tons were imported into India from Japan and Europe. It has now been found as a bed under the salt pans at Didwana, Jodhpur State, where it has probably accumulated over a period of at least 150 years. It is estimated that there are 250,000 tons, and it has now replaced all imported sulphate.

4. KENNETH HALL.

Aluminium in India.

The sample aluminium ingot exhibited is from the first aluminium to be made in India, and was produced on the 6th March, 1943, at the Aluminium Reduction Works of the Aluminium Production Company of India Limited in Travancore State. Since that date, these Works have been in full commercial production of virgin aluminium ingot.

The sample of aluminium sheet exhibited was rolled from aluminium produced in India at the Belur Rolling Mills of the same Company, which have been in commercial operation since August 1941, and which are at present engaged in rolling aluminium sheet for aircraft and other War requirements. These Rolling Mills are now being expanded for the production of strong alloy (duralumin) sheet.

India possesses ample resources of the ore of aluminium—bauxite—large deposits being found in Bihar, the Central Provinces and Bombay Presidency. The first stage in the production of aluminium consists of the crushing, calcining and chemical treatment of the ore, thereby eliminating impurities such as silica, ferric oxide, etc., and extracting the pure aluminium oxide, or alumina. The second stage is an electrolytic process, in which electric current is passed through a bath of molten cryolite, into which alumina is fed and reduced to aluminium and oxygen, the molten aluminium collecting at the bottom of the bath and being drawn off at intervals to be cast into ingots.

The reduction process requires large amounts of electric power, the availability of which is a prime factor in the establishment of an aluminium industry. In the case of the Alupuram Reduction Works, power is supplied from the Travancore State Hydro-Electric Scheme. In producing 1 lb. of aluminium, approximately 4 lbs. of bauxite, 3/4 lbs. of carbon electrode and 10 kilowatt-hours of electricity are consumed.

India is now producing its own supplies of aluminium, and has ample resources of bauxite ore and of electric power. Further expansion of this production is already planned and provided for. Modern Rolling Mills are busy rolling this aluminium into sheet—the principal form in which it is used by the fabricator. Large fabricating plants exist in the principal cities, formerly mainly engaged in utensil manufacture, but now fabricating aluminium for its manifold wartime uses. The return of peace, with increasing industrialization, will bring in its train the extensive use in this country of aluminium in the home, in transportation, in industry and in architecture—in short, wherever a metal possessing strength with lightness and a pleasing finish can be effectively used.

5. T. N. RAMACHANDRAN.

Terracotta Figures from Ghosi, District Azamgarh, U.P.

Within the last forty years Indian terracottas of early date have been found at many important sites, such as Mohenjodaro, Harappa,

Pataliputra, Kosam, Bhita, Sankisa, Basarh, Besnagar, Nagari, Buxar, Lauriya-Nandangarh and recently at Ghosi. An important series found by Pandit Rameshwar Dayal, Deputy Magistrate, near Ghosi, District Azamgarh, U.P., in an extensive and high mound, forty to fifty feet in height and about 117 *bighas* in area are now on display. There are also indications that the place must have been a large settlement representing many periods. Bricks of Maurya and Gupta periods and beads, coins, etc., were also found at this site.

The collection is large and consists for the most part of figurines, both human and animal, the former easily constituting the majority. Among human figurines, it is the female that is dominating and most interesting, being of different types. Animal figurines include heads of the ram and elephant that had apparently formed parts of toy-chariots as elsewhere. The animal figures bear also the stamping of designs such as wheel, leaf, etc., on their body. Human figurines include many of high antiquity comparable in some respects with the Indus Valley terracottas, others of Maurya and Sunga date, and others still later, Kushana and Gupta; while a few bearing sculptural tendencies have to be assigned a later Gupta or even mediaeval date. Thus at least six types can be made out belonging to six different periods and the site may very well be taken to represent or form part of a large settlement spreading over many periods.

6. ROYAL BOTANIC GARDEN, CALCUTTA.

(1) *Acacia sphaerocephala* Cham. and Schlecht, Mexico.

Myrmecophilous plant with Muller's gland.

(2) *Utricularia stellaris* Linn., India.

The minute submerged bladders serve as trap for microscopic aquatic animal organisms.

(3) *Nepenthes khasiana* Hook., Himl.

The pitcher plant with adaptation for catching insects.

(4) *Zamia floridana* A.DC., Ins. Bham. Cycadaceae with cones.

(5) *Vitex peduncularis* Wall., Ind. & Bur.

The well-known medicinal plant, used for curing black-water fever.

(6) *Alstonia scholaris* R.Br., Geront. trop.

Bark suggested for using with quinine in the treatment of malaria.

(7) *Cyperus Papyrus* Linn., Afr.

A well-known plant for paper manufacture.

(8) *Mammillaria tenuis* DC., Mexi.

Succulent cactus.

(9) *Mammillaria serpentina*, Mexico.

Succulent cactus.

(10) *Adiantum tenerum* var. *Farleyense*, West Ind.

A Royal Botanic Garden hybrid.

(11) *Victoria regia* Lindl., Brazil.

The famous Amazon lily in flower.

7. A. K. M. ZAKARIAH.

(1) *Holy Quran*.

This 'Holy Quran' is the acquisition of the exhibitor. It was written about three centuries ago by one of his ancestors and since then it is the acquisition of his family—an ancient and very respectable Moslem family of West Bengal, in the District of Murshidabad. The family have got the 'Sanads' (Royal Charter) granted by the Great Mughals, in their possession still bearing the Imperial Seals of Emperor 'Auranzeb-Alamghir-Gazi-Badshah', as well as bearing the Royal Seals of the independent Rulers of Bengal, in recognition of the services (educational) rendered by its members of those times. The family have got a 'Kursinama' (genealogical tree) bearing Royal Seals.

This book shows a superb piece of calligraphy, testifying not only to the copyist's wonderful patience, but also to his love of the Great Holy Book.

The original covers of the book were all eaten up by worms and repairing has been done in May 1943.

(2) *Photograph of Taj-Mahal*.

This photograph is a new study of the Taj-Mahal by an amateur Hawaiian photographer, Mr. C. F. Fraser (U.S.A.). This snap was taken in January, 1939, at Agra and it was developed and enlarged at Honolulu and a copy was sent to the exhibitor.

(3) *Photograph of Hawaiian Fisherman with his net*.

This is another photograph taken and done by Mr. C. F. Fraser, the amateur photographer of the Hawaii (U.S.A.).

8. ROYAL ASIATIC SOCIETY OF BENGAL.

I. *Library*.

The majority of the rare and valuable possessions of the Library had been sent out on account of the emergency conditions and the items exhibited are merely illustrative, and not exhaustive, of the rich and varied collections which have been built up during the past 160 years.

A. *General Section*.

Journal—Sir William Jones, the Founder of the Society, contemplated the publication of a volume of 'Asiatick Miscellany' every year, but no attempt was made to get out such a periodical during the first three years of the Society's career. The Society having no funds of its own at the time, Mr. Manuel Cantopher of the Hon. East India Company's Printing Office undertook such a publication as a private speculation and the first volume was brought out in 1788

under the name 'Asiatick Researches', instead of what the Founder had originally suggested. By 1797 five volumes came out and the work created such a sensation in the literary world that editions of it were brought out in different countries of Europe. Looking to the rapid and profitable sale which the first five volumes met with the idea was taken up by the Society in 1798 to bring out the 'Researches' on its own account. This publication ceased after the 20th volume in 1839 and the Society formally dropped it in 1842.

The form of the 'Asiatick Researches' was not suitable for short notes on new and important discoveries and ideas, which were necessarily left out, however interesting these notes might be. For a time these found place in the 'Quarterly Oriental Journal', which Dr. Wilson started in 1821, and in the 'Transactions of the Medical and Physical Society'. Both the publications were, however, dropped in 1827.

A substitute for these was provided in 1829 by J. D. Herbert in a monthly publication, which he started under the name of 'Gleanings in Science'. The Society benefitted by this publication so far that a precis of its monthly Proceedings, which had heretofore been prepared in MSS., was regularly published in this Journal.

In 1830 when J. D. Herbert left Calcutta, James Prinsep, instead of dropping the publication, proposed to change its name and call it 'The Journal of the Asiatic Society'. The sanction was given in March 1832, and the first issue of the Journal appeared under the caption of 'Journal of the Asiatic Society of Bengal'.

This Journal superseded the 'Researches'. In 1842 the 'Researches' was finally dropped and the 'Journal of the Asiatic Society of Bengal' was officially taken over by the Society.

From 1832 to date the Journal has been covered by three series:—

First Series—1832 to 1904.

Second Series—1905 to 1934.

Third Series—1935—(in progress).

Old and rare printed works.

1. Barthelemy. Travels of Anacharsis the Younger in Greece during the middle of the fourth century before the Christian era. 8 vols. London, 1791.

2. Astley, Thomas. A New General Collection of Voyages and Travels consisting of the most esteemed relations which have been hitherto published in any language comprehending everything remarkable in its kind in Europe, Asia, Africa and America. 4 vols. London, 1745.

3. Dirom. A Narrative of the campaign in India which terminated the war with Tipoo Sultan in 1792. London, 1793. An authentic account by an officer who took part in the operations.

4. Astley, Thomas. The Origin and Progress of writing . . . also some account of the origin and progress of printing. Second edition. London, 1803.

5. Halhead, N.B. A Grammar of the Bengali Language. Hooghly, 1778.

6. Pignorius, Laurentius. Characteres Aegyptii. Francofurti, 1608.

7. Asiatic Annual Register or a view of the History of Hindusthan and of the politics, commerce and literature of Asia. 1799–1811.

8. Ainslie, Whitelaw. Materia Medica of Hindoostan and Artisan's and Agriculturist's nomenclature. Madras, 1813.

9. Bartholomaeo, Paulinus. Systema Brahmanicum. Romae, 1791.

10. Marci Pauli Venetii. De Regionibus Orientalibus . . .
Haithoni Armeni. Historia Orientalis . . . Coloniae Branden-
burgicae, 1671.
11. Nicolas de Nicolay. Les Navigations Peregrinations et voyages,
faits en la Turquie. Paris, 1577.
12. Catrou. History of the Mogul dynasty in India . . . founded
on the Memoirs of Signor Manouchi, a Venetian, forty-eight years
Physician in the service of the Imperial Family, at the Court of
Delhi and Agra. London, 1826.
13. Agop. Grammatica Latina, etc. Romae, 1675.
14. Buxtor, Johannis. Lexicon Chaldaicum, Talmudicum et
Rabbinicum. Basilae, 1639-40.
15. The Ramayuna of Valmeeki in the original Sungskrit, with a
prose translation and explanatory notes by William Carey and
Joshua Marshman. Serampore (1806-1810).
16. Ancient Accounts of India and China by two Mohammedan
travellers who went to those parts in the ninth century; translated
from the Arabic by Eusebius Renaudot. London, 1733.

Manuscript works.

17. Vāyu Purāṇa. Translated by Horace Hayman Wilson.
18. Memoir on the Delhi Empire and Court, written by Antoine
Louis Henri Polier, a Swiss Engineer Major, who spent some time in
India in the seventies of the eighteenth century in the service of the
East India Company and of the then Emperor of Delhi. This
manuscript gives a very true description of and is far more detailed
about the Court intrigues than any Persian or Marathi account.
19. Memoir on the Climate, Soil, Products and Husbandry of
Afghanistan and the neighbouring countries: probably by Lt. Irvine.
20. Report on Caubul, probably by Elphinstone.
21. Memoir of a Map of Caubul, probably by Lt. Macartney.
22. Studies on Miscellaneous topics:—
 - (a) Biographical sketch of Lieutenant-Colonel William Lambton,
F.R.S., Superintendent of the Grand Trigonometrical
Survey of India, by John Warren, Assistant to Lieut.-
Colonel Lambton, 1823.
 - (b) On the building stones of Akbarabad, by H. Voysey (*As. Res.*,
Vol. XV, 1825).
 - (c) The Benares Communications, by William Cracroft and James
Prinsep. (*As. Res.*, Vol. XV).
 - (d) Geology of Bundelkhund and Jubbulpore, by J. Adam.
 - (e) Course and Levels of the river Sutty and Sutoodra, by Captain
J. D. Herbert. (*As. Res.*, Vol. XV, 1825.)
23. Index of Rungpore words, by Buchanan.
24. Index of Dinagepore words, by Buchanan.

B. Sanskritic Section.

1. R̥gveda: Aṣṭaka VI (No. I.M. 10190). Country-made paper.
Nāgarī. *Samvat* 1536/1478 A.D. Such early manuscripts of the
Veda are extremely rare.
2. Viṣṇupurāṇa: Aṁśas I-IV (No. I.M. 6685). Country-made
paper. Nāgarī. No date. *Circa* 13th-14th centuries A.D. Such
early MSS. of the Purāṇa are very rare.
3. Nilamatapurāṇa, dealing with the holy sites in Kāśmīra
(No. I.M. 1556). Kasmiri paper. Śāradā. No date.
4. Śāradātīlakaṭikā entitled Sampradāyadyotini: Paṭala I

(No. I.M. 8633), by Paramahansa Parivrājaka Gopālāsrama. Country-made paper. Nāgarī. No date. *This commentary is otherwise unknown.*

5. Rasadīpikā (No. I.M. 3622), an important work on Chemistry by Ātandānubhava Yogin. Country-made paper. Nāgarī. *Samvat* 1462/1404 A.D.

6. Meghadūta (No. I.M. 10001) 'The Cloud Messenger', by Kālidāsa. Country-made paper. Nāgarī. *Samvat* 1548/1490 A.D. Manuscripts of this celebrated poem of such an early date are extremely rare.

7. Mālavikāgnimitram (No. I.M. 3496), by Kālidāsa. Country-made paper. Nāgarī. *Samvat* 1558/1500 A.D. Such early MSS. are very rare.

8. Saptapadārthī (No. III. F. 16), a work on Vaiśeṣika philosophy, by Śivāditya. Country-made paper. Nāgarī. *Samvat* 1458/1400 A.D. Such early MSS. are rare.

9. Several manuscripts on Śivadharmā (No. G. 4077). Palm leaf. Old Newari. No date: *circa* 12th century A.D. With illuminations on the insides of the wooden covers.

10. Br̥hat-Svachanda-mahābhairava-tantra (No. G. 11308). Teret leaf. Proto-Bengali. No date: *circa* 11th century A.D. The work is otherwise unknown.

11. Gurudakṣiṇā (No. G. 4893), by Śyāmadāsa. Country-made paper. Bengali. B.S. 1112/1706 A.D.

12. Gaṇapātha (No. III. A. 174A). Sola pith. Bengali. B.S. 1157/1751 A.D.

13. Kāvya-prakāśaviveka (No. G. 4738), by Śrīdhara Ṭhakkura. Palm leaf (last folio only). Maithilī. L.S. 291/1409 A.D.

14. Māghamāhātmya (No. G. 5624), by Kṛṣṇadeva. Palm leaf. Uḍiyā. No date: *circa* 19th century A.D.

15. Bhaktipradīpa (No. G. 5378) in Assamese, by Kṛṣṇakiṅkara. Birch-bark. Old Assamese. Sāka 1563/1641 A.D.

16. Viveka-pañcāmṛta (No. I.M. 5864). An exposition in Hindi of the five sūtras: (1) Nandikeśvara, (2) Kāpila, (3) Patañjali, (4) Brahma, and (5) Sāṇḍilya. Country-made paper. Nāgarī. *Samvat* 1852/1794 A.D. With six illustrations in a style reminiscent of a mixture of the late Mughal and Rajput schools.

17. Yantrendra-prakāśa (No. I.M. 3733), by Maheśvara. An interesting work on astronomy blended with Tantric mysticism. Country-made paper. Nāgarī. No date: *circa* 17th century A.D. With fine illustrations of the signs of the Zodiac, etc.

18. Yogavāsiṣṭhasāra and several other stray works (No. 5865). Country-made paper. Nāgarī. No date: *circa* 18th century A.D. With six miniature illustrations.

19. Kammava Pali-daw (No. Bur. 58). Gold lacquered leaves. Burmese script.

20. Rāmāyaṇa (No. Bur. 123) in picture (abridged), according to the Burmese version. Burmese paper. Burmese script.

C. Islamic Section.

Arabic.

1. Al-Qur'ān (No. 6). The entire text has been copied in 32 folios only in minute and clear Indian Naskh. *Circa* 17th century A.D.

2. Al-Qur'ān: Chap. 48 only (No. 4). Copied by Shāh Naqī'u'd-Dīn Al-Husainī Dāmghānī, imitating the style of Yāqūt, in calligraphic Naskh of Khorāsānī type within gold 'Jadwals' and good vignette. *Circa* 17th century A.D.

3. Al-Qur'ān: Five Suras (No. 18). In calligraphic Indian Naskh within double gilt and ornamented 'Jadwals' and vignette. *Circa* 18th century.

4. Tafsīrū'l-Qur'ān li Ibn 'Arabī (No. 73). A commentary on Qur'ān dealing only with three suras by Muhyi'd-Dīn Abū Abd'illāh Muḥammad, surnamed Ibn 'Arabī (died 338/1240 A.D.). Transcribed at Mecca from the autograph of the author by 'Ubaidu'llah Muḥammad in H. 881/1476 A.D.

5. Al-Kashshāf 'An Haqā'iqi't-Tanzil (No. 58). A commentary on the Qur'ān by Abū'l Qāsim Jāru'l-lah Mahmud (born H. 467/1074 A.D.) dealing with suras XIX-XXXIX. Copied in Khorāsānī Naskh in H. 684/1285 A.D.

6. Al-Ḥāshiyatu'sh Sharifiyya (No. 62), by 'Alī b. Muḥammad surnamed As-Saiyyid Ash-Sharīf (died H. 816/1413 A.D.). Glosses on the commentary of the Qur'ān (Kashshāf). Copied in Khorāsānī Nastaliq probably in the 15th century A.D. Hopelessly decayed.

7. Sharḥu'l-'Aqā'id-i'n-Nasafi (No. 70). A commentary on the theological work, 'Aqā'id of An-Nasafi by Sa'du'd-Dīn Mas'ūd (born H. 716/1316 A.D.). Copied in Khorāsānī Naskh by Muḥammad Haidar in H. 853/1449 A.D.

8. Rasā'ilu'l-Ghazālī (No. 1065). Two rare treatises on Sufism by Abū Ḥamid Muḥammad (born H. 451/1059 A.D.). Copied in Persian Nastaliq by Ahmad in H. 851 and 852/1447 and 1448 A.D.

9. Iḥyā'ulūm ad-Dīn (No. 1205). Another treatise on Sufism by the same author. Copied in fine Naskh, with illuminated headings in different colours at the beginning of every kitāb (chapter), by Shaikh Abdu'llah in H. 1107/1695 A.D.

10. Taḥdhīb Sharḥ As-sab' Al-mu'allaqāt (No. old 1135). A commentary by Imām 'Alī b. 'Abdu'l-lah Al-Wahrānī on the seven ancient poems. Copied in good old Egyptian Naskh at Qāhira (Cairo) in H. 515/1119-20 A.D. *Extremely rare.*

Persian.

11. Ma'āriju'n-Nubuwwat (No. 51). An extensive biography of the Prophet Muḥammad, by Mu'īnu'd-Dīn, usually known as Mu'īn Al-Miskīn (died H. 907/1502 A.D.). Copied in Indian Nastaliq within gold-ruled borders within double page decorated 'unwāns' by Saiyyad Muḥammad in H. 1031/1621 A.D.

12. Zafar-Nāma (No. 73). The famous history of Timūr (died H. 807/1404 A.D.), by Shīrafu'd-Dīn 'Alī Yazadī (died H. 858/1454 A.D.). Copied in Khorāsānī Nastaliq with coloured borders with illuminated 'unwāns', by Abdu'l Latif at Bukhāra in H. 935/1528 A.D.

13. Dīwān-i-Khusraw (No. 569). A collection of Ghazals of Yamīnu'd-Dīn Abū'l-Ḥasan Amīr Khusraw (died H. 725/1325 A.D.). Copied in Khorāsānī Nastaliq in H. 917/1511 A.D.

14. Ma'āthir-i-Rahīmī (No. 140). Memoirs of Abdu'l Bāqī, an official under Abdu'r Raḥīm Khānkhānān to whom they are dedicated, dealing with the politics of the latter part of the reign of Akbar and the early part of that of Jahāngīr. Copied in Indian Nastaliq and containing at the end a note of collation with the original (*Muqābilā*), dated H. 1046/1637 A.D., by the author himself.

15. Ādāb-i-'Alamgiri (No. 378). A collection of official letters and various documents belonging to the reign of Aurangzīb, written in his name by his Secretary, Abū'l Fath Qābil Khān and collected and arranged by Šādiq Muṭṭalibī (died H. 1129/1716 A.D.). Copied in Indian Nastaliq in the 16th year of Muḥammad Shāh's reign, i.e. H. 1146/1733 A.D.

16. Faṭḥu'l Mujāhidīn (No. 1669). This well-known work by Zainu'l-'Ābidīn written by order and under the direction of Tipū Sultān of Mysore in H. 1197/1783 A.D., deals generally with the religious aspect of war against unbelievers and chiefly with the organization, drill and employment in action of the various branches of the army. Copied by Ḥasan 'Alī at Salāmābād in Shikasta Āmiz Nastaliq. *About 150 years old.*

II. Publication in 1943.

- (1) Journal.
(a) Letters, (b) Science, (c) Year-Book.
- (2) Bibliotheca Indica.
- (3) Price List.

9. ASUTOSH MUSEUM OF INDIAN ART, CALCUTTA UNIVERSITY.

Mehar (Chittagong District) Copperplate of Dāmodaradeva.

This inscription in Sanskrit records a grant of some land by King Dāmodaradeva, son of Vāsudeva, in the *Viṣaya* (district) of Paranāyi within the *maṇḍala* (division) of Samatāta, which was under the jurisdiction of the *bhukti* of Puṇḍravardhana. It is dated 1156 Śaka era, corresponding to 1234 A.D. One other copperplate of Dāmodara, dated 1165 Śaka era (1243 A.D.), is known to have been discovered from the Chittagong region (vide: *J.A.S.B.*, Vol. XLIII, 1874, pp. 318ff.). On the first side at the top there is an engraving which exhibits a figure fighting with and trampling upon another—perhaps a representation of some episode in the life of Kṛṣṇa, and on the second may be seen a flaming *Cakra* (discus—a characteristic symbol of Viṣṇu) on a crescent supported on an elaborate pedestal.

ANNUAL REPORT FOR 1943.

The Council of the Royal Asiatic Society of Bengal has the honour to submit the following report on the state of the Society's affairs during the year ending 31st December, 1943.

The Society lost by death Sir John Herbert, formerly Governor of Bengal and a Patron of the Society. It was he who, at the time of assumption of office as Governor of this Province, took the trouble of bringing back to the Society the famous Bhowal Copperplate from the India Office. It may be mentioned also that, through the kindness of The Lady Mary Herbert, ten of our most valuable paintings were kept in safe custody at Government House in Darjeeling as a precautionary measure against Air Raids. The Society passed a vote of condolence on the death of Sir John Herbert at the Ordinary Monthly Meeting in December.

The Council recorded with sincere regret the deaths of Messrs. Johan van Manen, C.I.E., and K. C. De, C.I.E., I.C.S., who were associated with the Society for several years, the former as General Secretary from 1923 to 1939 and the latter as one of the oldest Life Members since 1895.

The Society has lost during the year several eminent scholars and scientists among whom the following may be mentioned: Sir Nil Ratan Sircar, a leader of the medical profession and a former Vice-Chancellor of the Calcutta University; Sir Aurel Stein, the renowned explorer in the field of Central Asian archaeology and one of our Foundation Honorary Fellows; and Sir Sydney Burrard, an eminent geographer and mathematician serving in the Survey of India as its Director some years ago, who was one of our Special Anniversary Members.

The Society and the scholarly world are the poorer owing to the death of these distinguished devotees of science and culture.

Patronage.

His Excellency Field Marshal The Rt. Hon'ble The Viscount Wavell, P.C., G.C.B., G.M.S.I., G.M.I.E., C.M.G., M.C., Viceroy and Governor-General of India, has been graciously pleased to become a Patron of the Society.

Ordinary Members.

<i>Gains.</i>		<i>Gains and Losses.</i>		<i>Losses.</i>	
Elections carried forward	.. 6			Lapses of elections	.. 5
New elections	.. 59			Elections carried over	.. 3
				Withdrawals of application	.. 1
				Deaths	.. 9
				Resignations	.. 2
				Rule 38	.. 5
				Rule 40	.. 3
TOTAL	.. 65			TOTAL	.. 28

Initial total 375; net gain 37; final total 412.

Life Members.—The number at the end of the year is the same as last year, viz., 58. Three died; and three members compounded.

Deaths.

Sir Bryce C. Burt (1934).

K. C. De (1895).

G. de P. Cotter (1929).

Johan van Manen (1918).

Sir Chhajuram Chowdhury (1927).

T. B. Jameson (1926).

Sir Nil Ratan Sircar (1924).

S. S. Huda (1940).

Rai Bahadur P. N. Mullick (1929).

Associate Members.

The Rev. William Pettigrew (1939) has died and Mr. W. S. Birney was elected.

At the end of the year the number stands at 6: the statutory maximum is 15.

Ordinary Fellows.

At the Annual Meeting held on the 1st February, 1943, Mr. A. F. M. Abdul Ali and Sir J. C. Ghosh were elected.

Mr. Johan van Manen (1927) and Mr. G. de P. Cotter (1930) have died.

At the end of the year the number stands at 47: the statutory maximum is 50.

Honorary Fellows.

During the year Sir Aurel Stein (1920) died.

The number at the end of the year stands at 16: the statutory maximum is 30.

Special Anniversary Honorary Members.

Sir Sydney Burrard, K.C.S.I., F.R.S., has died.

At the close of the year there remain only 8 Special Anniversary Members on the roll.

Council.

The Council met 14 times. The attendance averaged 12.

Office Bearers.

Changes in the Council were as follows :—

Dr. R. C. Majumdar, Historical and Archaeological Secretary, was appointed also as Library Secretary on 3-5-43 *vice* Dr. S. L. Hora, resigned, who remained an Ordinary Member of the Council.

Mr. Justice Edgley, offg. Treasurer from 19-4-43 to 28-5-43 and from 5-9-43 to 1-11-43.

Mr. Gurner, absent from 19-4-43 to 28-5-43.

Mr. Percy Brown, absent from 1-4-43 to 1-11-43.

Dr. Griffiths, absent from 6-5-43 to 21-6-43.

Dr. Agharkar, absent from 10-5-43 to 1-7-43.

Dr. S. P. Mookerjee, absent from 6-8-43 to 24-8-43.

Dr. S. L. Hora, absent from 1-7-43 to 15-8-43.

Sir John Lort-Williams, absent from 25-8-43 to 1-11-43.

Sir Cyril S. Fox, absent from 1-9-43 to 1-11-43.

Dr. Siddiqi, absent from 15-9-43 to 1-11-43.

Committees of Council.

The Standing Committees of Council, namely, the Finance, Publication, and Library Committees met monthly. A special meeting of the Finance Committee was held in December to consider the Budget for 1944. The Standing Programme Committee met four times during the year and the Bibliotheca Indica Committee only thrice.

The following Sub-Committees were appointed :—

A Sub-Committee consisting of the *ex-officio* Members, Dr. M. N. Saha, Dr. S. K. Chatterji, Dr. M. Z. Siddiqi, Dr. R. C. Majumdar, Dr. J. B. Grant, Dr. S. L. Hora, Mr. Justice Edgley, and Mr. W. D. West with power to co-opt additional members, if necessary, to work out details of the celebrations and prepare a programme for the 160th Anniversary of the Society in February, 1944.

A Special Sub-Committee consisting of the *ex-officio* Members, Sir John Lort-Williams, Dr. S. L. Hora, and Dr. S. P. Agharkar to look into the question of the ownership of the publications of the Indian Science Congress Association and to report to the Council.

A Board consisting of the President, General Secretary and Dr. Griffiths for framing suitable Regulations for the award of the Sarat Chandra Roy Medal.

Office and Staff.

Changes in the staff were as follows :—

Mr. J. C. De, the temporary Assistant Secretary (in charge of the Library), resigned with effect from January, and Mr. D. K. Das, who was in charge of the Publication Department, also resigned towards the end of January. Mr. De was replaced by Mr. S. K. Saraswati, M.A., who had been doing part-time work in the Library since January, 1943, and was appointed Librarian

for three years on Rs.150—25—200 per month. Mr. D. Burman, M.Com., was appointed in place of Mr. Das to be in charge of the Publications on a part-time basis of 3 hours a day on a remuneration of Rs.100 per month. Mr. S. K. Ray, who was transferred to the Library at the beginning of the year to officiate for the Librarian, was re-transferred to the Office to his former status as General Assistant and to be in charge of the old files. Mr. N. Gupta who was temporarily transferred to the Library as an assistant was later placed in the Publication Department to be in charge of Sales. Mr. B. C. Bose, M.A., who was acting as an assistant in the Library, since January when he supervised the bringing down of over 12,000 volumes from the top to the ground floor, as precaution against Air Raids, was appointed in Mr. Gupta's place temporarily on a salary of Rs.75 per month.

It is to be regretted that Mr. Trin Chen, our Sino-Tibetan clerk since 1939, was in indifferent health for some time, and he died in service in December. None has been appointed in his place.

During the year, the Council took up the question of the cataloguing of books in the English Section of the Library, and it was decided to prepare both author and subject catalogues for the printed books acquired in the English Section of the Library before 1934. To give effect to this recommendation of the Library Committee, Mr. Sivasankara Mitra, M.A., was appointed cataloguer on a salary of Rs.100 per month, subject to an average monthly output of 600 volumes.

Subordinate Staff.—In the subordinate staff the usual minor changes took place. The Council had to dispense with the services of the office Duftry, Sk. Chunna, as a disciplinary measure. In addition to the two bearers now working in the Library, the Council decided to employ one more bearer temporarily to assist in the reorganization work of the Library with special reference to our 'Periodicals' Section.

Correspondence.

In spite of the war and curtailed activities of many offices in India and abroad, the number of letters received during the year was 1,893 and issued 2,342. Of incoming letters, several were book orders, and a number of letters were issued in connection with the Discussion Meetings. Regular Monthly Meeting notices and Discussion Meeting notices were issued to members and visitors, in addition to invitations to the General Lectures.

In addition, 164 Council and Committee circulars were issued.

Stock Room.

Re-arrangement of the Stock Rooms on the ground floor was continued. A complete stock-taking of the Society's publications for sale was made under the direction of Mr. D. Burman.

Rules and Regulations.

No changes were made in the Rules, but a minor amendment was made in the Regulations regarding the Library with regard to the inclusion of 'Coins' as part of the Library collection. A set of Regulations were adopted by the Council regarding the award of the Dr. Bimala Churn Law Gold Medal and the Sarat Chandra Roy Memorial Medal.

Representations.

Indian Museum.—The Society's representative on the Board of Trustees of the Indian Museum, under the Indian Museum Act X of 1910, continued to be Dr. J. N. Mukherjee.

Kamala Lectureship.—The Society's nominee to serve on the Selection Committee of Kamala Lectureship, administered by the Calcutta University, was Dr. R. C. Majumdar.

National Institute of Sciences of India.—The Society's representatives to serve on the Council of the National Institute of Sciences of India were Mr. W. D. West as Vice-President and Dr. D. M. Bose as Member of Council for 1943.

Sarojini Bose Gold Medal.—The Society's nominee to serve on the Special Committee for the award of the medal administered by the Calcutta University, was Dr. Bimala Churn Law.

Royal Asiatic Society of Great Britain and Ireland.—The Society's nominee for the corresponding fellowship of the Royal Asiatic Society of Great Britain and Ireland was Dr. S. K. Chatterji.

Indian Historical Records Commission.—The Society's representative to serve on the Commission was Mr. C. W. Gurner.

Deputations.

The Society received invitations to send representatives to the various functions of the under-mentioned bodies:—

The meeting of the Symposium of the National Institute of Sciences of India at Calcutta on the 27th and 28th September. Dr. R. C. Majumdar and Dr. M. Ishaque were nominated to represent the Society.

The 12th Session of the All-India Oriental Conference at Benares in December. Dr. R. C. Majumdar was nominated to represent the Society.

The 6th Session of the Indian History Congress at the Muslim University, Aligarh. Dr. R. C. Majumdar was nominated to represent the Society.

The second meeting of the Symposium of the National Institute of Sciences of India to be held in Delhi. Drs. M. N. Saha, S. P. Agharkar and R. C. Majumdar were nominated to represent the Society.

Awards.

Elliott Prize for Scientific Research.—The annual prizes offered for the years 1941 and 1942 were Chemistry and Physics respectively. Two candidates submitted papers for 1941 and only one candidate for 1942. The prize for 1941 was awarded to Dr. M. C. Nath of the Dacca University. No award was made for 1942 as the papers submitted by the candidate were not of sufficient merit.

The annual prize offered for the year 1943 is for Geology and Biology (including Pathology and Physiology). Announcement regarding the prize will be made at the Annual Meeting in 1944.

Barclay Memorial Medal.—The biennial award of the medal for conspicuous contributions to Medical and Biological Science with reference to India, for 1943, will be announced at the Annual Meeting in 1944.

Sir William Jones Memorial Medal.—The triennial award of the medal for conspicuously important Asiatic Researches in Philosophy, Literature and History for 1943 will be announced at the Annual Meeting in 1944.

Annandale Memorial Medal.—The (triennial) award of the medal for important contributions to the study of Anthropology in Asia, for 1942, was announced at the Annual Meeting in 1943. The medal was awarded to Dr. Birajasanker Guha, Anthropologist to the Zoological Survey of India.

The next award of the medal will be made at the Annual Meeting in 1946.

Joy Gobinda Law Memorial Medal.—The next (triennial) award of the medal for 1944 will be announced at the Annual Meeting in 1945.

Paul Johannes Brühl Memorial Medal.—The (triennial) award of the medal for important contributions to the study of Asiatic Botany for 1942 was announced at the Annual Meeting in 1943. The medal was awarded to Rao Bahadur G. N. Rangaswami Ayyangar, Geneticist and Millets Specialist, and retired Principal, Agricultural College and Research Institute, Coimbatore.

The next award of the medal for 1944 will be made at the Annual Meeting in 1945.

Indian Science Congress, Calcutta Prize.—The next award of the prize in connection with the session of the Congress, held in Calcutta in 1943, will be announced at the Annual Meeting in 1944.

Pramatha Nath Bose Memorial Medal.—The announcement of the first and initial award of the medal for conspicuously important contributions to practical and theoretical Geology

with special reference to Asia will be made at Annual Meeting in 1944.

Dr. Bimala Churn Law Gold Medal.—Dr. Bimala Churn Law has made a handsome donation of Rs.8,000 in 3½% G.P. Notes for the institution of a gold medal to the value of Rs.280 to be bestowed annually on a person who is considered to have made conspicuously important contributions to any one of the following subjects: History, Geography, Philosophy, Religions, Ethnology, Folklore, Fine Arts and Architecture, with special reference to India, from the earliest time down to the thirteenth century A.D., and Bengali language, literature and philology. He has given also Rs.185, the cost of the dies and a sum of Rs.280 to meet the cost of the first and initial award of the medal to be made at the Annual Meeting of the Society in 1944. The Council have accepted the donation with thanks. The announcement of the award will be made at the Annual Meeting in 1944.

Library.

The year 1943 has been a year of serious and earnest re-organization in the Library. A definite scheme of classification and cataloguing of printed books in the General Section was pursued. As a first step the preparation of Authors and Subjects Catalogues of books added to the General Section of the Library during the period 1934–1942, i.e. after the last issue of the printed catalogue, was taken in hand and completed under the supervision of Mr. P. C. Bose, Deputy Librarian, Calcutta University Library, who was deputed for the purpose by the University Librarian. Books added to the General Section in the above period have been, as far as they could be picked out from the shelves, entered in a new Accession Register of standard form and classified according to Dewey's Decimal Scheme, classification being limited to broad divisions with such expansions as are required by the special character of the collection. Books, thus classified, have been further individualized with Cutter-Sanborn Author marks. The sheaf form of catalogue, which had been adopted in previous years, was continued.

After the completion of this work, the preparation on the above lines of Authors and Subjects Catalogues of all the printed books acquired before 1934 has been undertaken as a special work and is being continued. The total number of books thus classified and catalogued under the above two heads is 2,502.

The Sanskritic and the Islamic sections also were included in the reorganization scheme. A definite plan for the preparation of brief catalogues of the manuscripts in the Society's possession was drawn up by Mr. S. K. Saraswati, and work was begun in the two sections accordingly. In the Sanskritic section the Indian Museum collection of manuscripts, which had been lying

practically unexplored since its accession eight years ago, was taken up and 4,943 manuscripts have been catalogued during the year. In the Islamic section 160 manuscripts have been catalogued and if work be continued on the lines adopted, it may be hoped to get together up-to-date catalogues of all the collections in the different sections within the next year or two. The main stock and the chief resources and specialities of the Library can thus be placed before interested people for utilization in the best possible manner.

The large collection of coins, lying dumped in big bundles in a steel cabinet in the Sanskrit section, was examined and a preliminary sorting, with a view to a detailed study, has been made.

A new and useful feature introduced this year is the issue of regular classified bulletins, month by month, of new accessions in the Library. This has proved immensely helpful to readers and has an added advantage in the fact that books are being classified and catalogued immediately they are received, thus avoiding accumulation of work in this respect. The number of books thus catalogued is 302.

Much of the success of the reorganization scheme is due to the enthusiasm and sustained interest of Sir John Lort-Williams. Thanks are due also to Dr. R. C. Majumdar, Chairman of the Library Committee, for his expert help and active co-operation and to Khan Bahadur K. M. Asadullah, Librarian, Imperial Library, for his kind advice and general assistance in lending necessary reference books.

General Section.—Exclusive of periodicals, there were 242 new accessions during the year, against 132 in 1942. Of these, 73 were purchased and 101 were received as presentations. The remaining 68, including some very rare and old volumes, were recovered from discarded papers and under the instructions of the Library Committee were registered and catalogued. On account of the international situation there has been a further drop in the number of periodicals received—a cause that was also responsible for a limited number of purchases, the majority of our orders to foreign countries still remaining unexecuted.

Three new journals were added to the Library by exchange, namely, (1) Journal of the Numismatic Society of India; (2) University of Ceylon Review; and (3) Journal of the Ganganath Jha Research Institute.¹

The total number of volumes lent out during the year was 900, against 569 last year. An improvement in this direction was due, in a large measure, to the increased facilities for use of the Library as the result of reorganization. Members and non-members also made an extensive use of the Library in the rooms of the Society, the total number of such issues being over 650.

Sanskrit section.—In respect of printed books there were 57 new accessions, against 17 last year. Of these, 15 were purchased

and 42 were received as presentations. There has been no accession of manuscripts during the year.

The total number of books lent out was 116, against 56 last year. Manuscripts lent out to different institutions and individuals numbered 8 and several such requisitions could not be met on account of the MSS. in question having been sent away for reasons of security. Books and manuscripts used within the rooms of the Society totalled 184 and 135 respectively, recording a distinct improvement over last year's figures.

In connection with the preparation of a catalogue for the Sanskrit manuscripts which are not included in the catalogues already printed, Pundits Jagadish Bhattacharya, Ramdhan Bhattacharya and Nani Gopal Bhattacharya were engaged temporarily as cataloguers on a remuneration calculated at the rate of Rs.25 for every 100 manuscripts catalogued. The work started in September.

Islamic Section.—There have been only three new accessions of books in this section, all by presentation, against one of the previous year. No new manuscript was added to the section.

The total number of books lent out was 93, against 46 last year. As in the previous year only 1 manuscript was lent out. Books and manuscripts used in the rooms of the Society numbered 95 and 22 respectively, against 73 and 22 in the previous year.

During the year the Council took up the question of the cataloguing of manuscripts belonging to the Islamic section which was at a standstill after the death of Dr. M. Hidayat Hosain, and it was decided to entrust the work on an honorarium basis to Drs. S. A. Imam and A. B. M. Habibullah, both of the Calcutta University, to the former the catalogue of Arabic manuscripts and to the latter that of Persian manuscripts. They will start work early in 1944.

Sino-Tibetan Section.—A complete list of Tibetan and Chinese collections was made during the year. The Tibetan collection consists of 481 volumes in MSS. and xylographs, and represents a complete collection of the Kangyur and the Bstangyur. The strength of the Chinese collection is 146, including the complete Tripitaka series.

Binding and Repair.—Altogether 778 volumes were bound against 961 in 1942. The drop is due to the scarcity of necessary materials, resulting in a corresponding rise in the cost of binding.

Manuscripts repaired in the Sanskrit and the Islamic sections numbered respectively 49 and 104, against 128 and 131 in the previous year. The repair work was stopped under the instructions of Dr. S. N. Sen, Keeper of Imperial Records, until the formulation of a comprehensive and approved scheme for the preservation of manuscripts, books, etc. in the Society's

Library. It is a pleasure to note that such a scheme has been drawn up and approved by the Government of India, which has provided for an additional annual grant under this head in next year's budget. It is hoped that the scheme will be in operation from 1944.

Book Reviews.—Several books were added to the Library as presentations under this head. Every effort is being made to meet our obligations on this count by bringing out the arrear reviews as soon as possible.

Permanent Library Endowment Fund.—The total of this fund is now Rs.17,863-3-8 in $3\frac{1}{2}\%$ Government Paper.

The above shows a general improvement in the work of the Library in its different sections. In spite of the unsatisfactory condition prevailing in previous years, and the serious dislocation caused by air raids, the definite programme of reorganization inaugurated this year and carried on by a loyal and efficient staff under the direction and supervision of the Library Committee and the Council, has already resulted in a marked improvement in the working of the Library and further progress is expected in the years to come as the new programme approaches its completion.

Finance.

Appendix III contains the usual Statements showing our accounts for 1943. No change has been made in the form of their presentation.

The following two new funds have been opened:—

- (1) Dr. Bimala Churn Law Gold Medal Fund for Indology. (Statement No. 15.)
- (2) Sarat Chandra Roy Medal Fund for Cultural Anthropology. (Statement No. 16.)

Details of these funds are given elsewhere in the report.

During the year Rs.1,600 were received as admission fees and Rs.610 as compounding fees. The total amount of Rs.2,210 will be transferred to the permanent reserve by conversion of Government Paper ($3\frac{1}{2}\%$) belonging to the Temporary Reserve.

The Government of Bengal maintained the 20% cut in some of the grants made by them to the Society.

The Government of India maintained the 50% cut in the grant for the Arabic and Persian MSS. Fund (Statement No. 5) which closed with a debit balance of Rs.153-1-6.

The Government Securities, shown in Statement No. 25, are held in safe custody by the Imperial Bank of India, Park Street Branch. During the year there was an appreciation of the Securities, thus increasing the book assets of the Society.

BUDGET ESTIMATE FOR 1944.

Ordinary Receipts.

<i>Budget heads.</i>	Budget estimate for 1943. Rs.	Actuals for 1943. Rs.	Budget estimate for 1944. Rs.
Interest on Investments and Deposits	{ 9,860	9,914	9,900
Advertising	{ 450	450	450
Rent	10,200	10,200	10,200
Annual Grant from the Govt. of Bengal for publication of Journal	10,680	10,800	10,800
Miscellaneous	1,600	1,600	1,600
Members' Subscriptions	350	677	450
Publication Sales and Subscriptions to Journals and Memoirs	8,000	8,890	8,500
	4,000	4,991	4,500
TOTAL ..	45,140	47,522	46,400

Extraordinary Receipts.

	Rs.	Rs.	Rs.
By Fees—			
by Admission Fees	700	1,600	800
by Compounding Fees .. ..	..	610	..
TOTAL ..	700	2,210	800

Ordinary Expenditure.

	Rs.	Rs.	Rs.
Salaries and Allowance	23,700	22,137	23,800
Commission	280	212	300
Stationery	500	620	1,000
Fan, Light and Telephone	600	782	800
Taxes	2,400	2,387	2,400
Postage	1,000	955	1,000
Contingencies	1,000	810	800
Petty Repairs	150	16	50
Insurance	500	793	800
Menials clothing	250	276	50
Office Furniture	200	150	50
Building Repairs	1,500	1,500	1,000
Provident Fund Share	700	620	700
Audit Fees	250	250	250
Books, Library	1,500	1,030	2,000
Binding, Library	2,000	1,704	1,500
Journal and Memoirs	5,750	5,164	4,600
Printing, Circular, etc.	800	590	600
A.R.P. Measures	560	436	..
Dearness Allowance	1,500	4,008	3,500
Cataloguing (Library) .. ..	..	400	1,200
Honorarium (Library) .. ..	..	300	..
TOTAL ..	45,140	45,140	46,400

Extraordinary Expenditure.

	Budget estimate for 1943.	Actual for 1943.	Budget estimate for 1944.
	Rs.	Rs.	Rs.
To Permanent Reserve—			
By Admission Fees ..	700	1,600	800
Compounding Fees ..	..	610	..
TOTAL ..	700	2,210	800

Publications.

The complete volume of the *Journal* for the year has been published and distributed to members. The volume is composed of four numbers (2 Letters, 1 Science and 1 Year-Book). The Title-pages and Indices for Volume VIII, viz. Letters, Science and Year-Book, have been published and issued.

Memoirs.—Good progress has been made in the printing of *Mahāvīyutpatti* by Alexander Csoma de Kőrös. The complete book in Sanskrit, English and Tibetan has been sent to the press with print order and is expected to be published early in 1944.

Bibliotheca Indica Series.

(i) *The Doctrine of Nimbārka*, Vol. III, by Dr. Rama Chaudhuri, has been published. This completes the work. A general Index for all the three volumes has been printed along with this one.

(ii) *Kuttanimatam*.—Edited with notes by Pandit Madhusudan Kaul of Kashmir. The text of the book has been printed. Introduction and Notes are being prepared with a view to immediate publication.

(iii) *Padmāvatī*.—English Translation by Mr. A. G. Shirreff, I.C.S. Pages 1–144 have been printed off. Pages 145–176 have been set up in type and it is expected to complete the book early in 1944.

(iv) *Index of Amal-i-Salih*.—Pages 1–80 of the Index have been received from Dr. G. Yazdani and have been sent to the press.

Descriptive Catalogue of Manuscripts in the possession of the Royal Asiatic Society of Bengal.

I. (i) *Descriptive Catalogue of Sanskrit MSS.*, Vol. X, Astronomy and Astrology, prepared by MM. H. P. Shastri, and revised and edited by Prof. P. C. Sen Gupta. Pages 1–128 have been printed off.

(ii) *Descriptive Catalogue of Sanskrit MSS.*, Vol. XI, Philosophy, prepared by MM. H. P. Shastri, and revised and edited by Prof. N. C. Bhattacharyya, Vedantatirtha. Pages 1–112 have been sent to the press with print order.

II. (i) *Catalogue of Arabic MSS.*, Vol. II.—Since the death of Shams'ul Ulama Dr. M. Hidayat Hossain, the work remained in abeyance. The task of completing the volume has now been entrusted to Dr. S. A. Imam.

(ii) *Catalogue of Persian MSS.*—The task of preparing a third supplement to the Descriptive Catalogue of Persian Manuscripts in the Society's collection has been entrusted to Dr. A. B. M. Habibullah.

III. *Catalogue of Vernacular MSS.*—A Supplementary Volume to the Descriptive Catalogue of the Vernacular MSS. containing a comprehensive errata and descriptions of some uncatalogued MSS. has been prepared by Mr. Prafulla Chandra Pal, M.A., and has been sent to the press.

The following works are still under preparation :—

- (1) *Haft-Iqlim*, Vol. II, by Prof. M. M. Haq.
- (2) *Bhagavad Gītā* (in Persian verse) by Dr. Baini Prashad.
- (3) *Maāthir-ul-Umarā*, Vol. II, English Translation by Dr. Baini Prashad.
- (4) *Ain-i-Akbari*, Vols. II and III, English Translation, revised and edited by Sir Jadunath Sarkar.

Introduction of Vajjalaggam.

The Introduction to the Prakrit anthology Vajjalaggam, written in 1916 by Julius Laber, was discovered, while rearranging the old files, in the galley proof stage and bearing corrections by that eminent scholar. The Bibliotheca Indica Committee has ordered the re-issue of the book with this Introduction and an Index prepared by Dr. Manomohan Ghosh. This has been sent to the press.

Publication of a thoroughly revised Price List.

In response to repeated enquiries, the preparation of an up-to-date and thoroughly revised price list of Society's publications was undertaken by Mr. D. Burman in February and was issued in June. It was greatly appreciated by the members and well-wishers of the Society. This price list has been published after an interval of 14 years, the last one having been printed in 1929.

Reorganization of the Publication Department.

In pursuance of the report submitted by Dr. N. Dutt and adopted by the Council in July, the task of selling the Society's publications has been transferred to the Publication Department. His report was based on the stock valuation statement prepared by Mr. D. Burman, M.Com., which revealed that a large portion of the publications was tending to become dead stock. Dr. Dutt recommended (i) reduction-sale for six months ending in January, 1944, (ii) advertisement in important journals, and (iii) distribution of the new price list to learned Societies and Universities. With the sanction of the Council, immediate

effect was given to these recommendations. The result was prompt and encouraging. Sales now are more than five times higher than during the past two years. This increase in sales naturally liquidates the Society's old and decaying stock. The additional revenue thus earned may be re-invested in new books or in reprinting important old works, stimulating thereby the cultural activities of the Society through its research publications.

A thorough stock-taking of the Society's publications was undertaken in August and has been completed.

Air Raid Precautions Fund.

As stated in the last Annual Report, this fund was started by H.E. Sir John Herbert in 1942, and the Council are grateful to those members of the Society who have generously contributed to this fund. The total amount collected under this head was Rs.8,688-10-0 during the last two years. The fund was closed towards the middle of the year. The amount realized was allocated proportionately to the three separate funds from which money was drawn at the beginning for meeting the A.R.P. expenses of the Society. It may be mentioned that the Council are grateful to the Government of Bengal for a special grant of Rs.4,000 made for the purpose. During the year additional A.R.P. measures were taken by way of erecting baffle walls around a room on the ground floor with the object of making it a shelter for the employees of the Society in the event of Air Raids.

Cultural Activities.

(a) ORDINARY MONTHLY MEETINGS.

These meetings were held regularly with the exception of the recess months, September and October. The average attendance was 16 members and 5 visitors. The maximum attendance was in February and August with 39 members and 14 members and 22 visitors respectively.

The meetings of June and July were devoted mainly to the symposium on the 'Early History of Bengal on the basis of recent researches' opened by Dr. R. C. Majumdar.

There were no special meetings of the Medical Section but our Medical Secretary, Dr. J. B. Grant, is ever active, co-operating with various official and non-official boards of Medical Aid during the War.

(b) EXHIBITS.

At the Ordinary Monthly Meetings several interesting exhibits were shown and commented upon. The following may be mentioned:—

Percy Brown: A portable shrine, and a miniature replica, in bronze, of the colossal Trimurti Rock Sculpture in the rock-cut Temple on the Island of Elephanta, Bombay.

L. R. Fawcus : Flint Implements from Syria.

R. C. Majumdar : Two Copperplate Grants of Śaśāṅka ; and a new Inscription, engraved on an Image of Gaṇeśa.

M. M. Haq : Fragment of the original illustrated Persian Translation of the Kathā Sarit Sāgara made at the instance of Emperor Akbar.

General Secretary : Thirteen Koch and Tippera Coins ; certain valuable scientific papers and books by past and present members of the Society ; some rare manuscripts from the Society's Archives.

(c) CULTURAL AID.

In addition to the General Lecture and the Discussion Meetings, facilities were offered to scholars and men of the Allied Forces for study and research ; and help was also rendered to learned societies and enquirers outside Calcutta on matters of antiquarian and historical interest.

(d) GENERAL LECTURES.

During the year two General Lectures were delivered before a large audience of members and visitors :—

3rd June : Mr. Sris Chandra Chatterjee on ' Contribution of Greece and India to Architecture and Culture '.

20th August : Rao Bahadur K. N. Dikshit, Director-General of Archaeology in India, on ' Recent Archaeological Explorations at Ramnagar and at the Prehistoric sites ' and Mr. T. N. Ramachandran of the Indian Museum on ' New Discoveries at Mainamati, Comilla, Bengal '.

(e) DISCUSSION MEETINGS.

As stated in the Annual Report of last year, Discussion Meetings were introduced as a part of the cultural activities of the Society in connection with our War services. It was arranged by the Programme Committee to have them once every fortnight ; but during the year, owing to the demands for more frequent social and cultural reunions, the Council decided to have them every week with effect from 1944. Invitations to the meetings were regularly extended to members of the Allied Forces (British, Indian, American and Chinese), and they were well attended and topics chosen by speakers, civilian and military, evoked considerable interest. With the exception of the Autumn Holidays, regular meetings were held. Many of the lectures were illustrated by charts and lantern slides.

The Council are grateful to the Hon'ble Mr. Justice N. G. A. Edgley for making our Discussion Meeting programme as attractive and instructive as possible. He has been instrumental in securing the full co-operation of the Military Authorities represented by Brigadier Williams of the Fort William and Brig. General J. A. Warden of the U.S.A. Forces.

January 7th..	Dr. S. K. Chatterji: Languages of India.
„ 21st	Dr. R. C. Majumdar: Bengal as Lord Clive found it.
February 4th	Dr. B. S. Guha: Races and Cultures of India.
„ 18th	The Hon'ble Mr. Justice N. G. A. Edgley: Temples of India.
March 4th ..	Sir Jadu Nath Sarkar: Indian Warfare in the Eighteenth Century.
„ 18th ..	Mr. Percy Brown: Historic Buildings of Delhi.
April 1st ..	Mr. Clayton Lane: Backgrounds of American Books.
„ 15th ..	Dr. J. N. Banerjee: The Gods and Goddesses of India.
„ 29th ..	The Hon'ble Mr. Justice N. A. Khundkar: Some Great Moghul Women.
May 13th ..	Dr. N. R. Ray: Revival of Arts in Modern India.
„ 27th ..	Mr. O. C. Gangoly: Ragini Pictures (Indian Musical Modes in Indian Art).
June 10th ..	The Hon'ble Mr. Justice R. B. Pal: Dawn of Law in Ancient India.
„ 17th ..	Major C. S. Cutting: Tibet.
„ 24th ..	Lt. Rolfe Haatvedt: The Excavations of the University of Michigan in Graeco-Roman Egypt.
July 8th ..	Mr. L. R. Fawcus: Jungle Life in Bengal.
„ 22nd ..	Mr. R. M. Hawes: The Nepalese.
August 5th ..	Dr. Stella Kramrisch: Ancient Indian Sculpture.
„ 19th ..	Dr. A. Chakravarti: Dr. Rabindra Nath Tagore: His Poetry and Art.
September 2nd	Capt. P. Johnson-Marshall: City and Regional Planning.
„ 16th	Mr. C. P. Lawson: Future of Indian Agriculture.
November 11th	Prof. Eric Dickinson: Art in Gandhara.
„ 18th	Dr. W. A. Jenkins: Educational Ideals, ancient and modern.
December 2nd	Rev. W. J. Culshaw: Santhals, an aboriginal Tribe.
„ 16th	Mr. M. A. F. Hirtzel: The River Systems of Bengal.

General.

Routine work in respect of the local distribution of the Society's publications, circulars, forms, etc. and the keeping up to date of the addresses of members was carried out as usual, but the posting of journals, etc., to belligerent and many neutral countries affected by the war was either stopped altogether, or was seriously handicapped by delays in shipment.

Printers.

Under the capable superintendence of Mr. G. E. Bingham the Baptist Mission Press continued to act as our chief printers and gave, as usual, their valuable assistance. Mention also may be made of the help rendered by the Directors of the Calcutta Oriental Press, the General Printers Ltd. and the Inland Printing Works in doing minor printing work for the Society.

Agencies.

Our European, American and Indian Agents remain the same. An extension of the list to other Asiatic countries could not be arranged owing to the unsettled world situation.

Exchange of Publications.

The following applications for exchange with the Society's publications were considered by the Council and its decisions are noted against each:—

<i>Publications of :</i>	<i>To be exchanged with :</i>
Numismatic Society of India (Journal)	Journal, Letters.
University of Ceylon (Ceylon Review)	Journal, Letters.
Mining, Geological and Metallurgical Society of India (Quarterly Journal)	Journal, Letters.
Calcutta University (all publications)	All publications including Bibliotheca Indica and Catalogues.
Ganganath Jha Research Institute (Quarterly Journal)	.. Journal, Letters.

Solicitors.

The Society is under special obligation this year to its Solicitors, Messrs. B. N. Basu & Co., for their prompt and valuable services in legal matters. To the head of the firm, Mr. J. N. Basu, and his able assistants, we are specially indebted for their courtesy and ungrudging help on all occasions.

Conclusion.

The presence in our midst of a distinguished representative of the Royal Society of London, and of the *Academia Sinica* of Chungking, on this our 160th Anniversary, is not only in keeping with the past traditions of our Society, but a happy augury for its future. Amidst the storm and stress of the Second World War of this century, we cannot help hoping for a wider and deeper diffusion of culture and the growth of a new humanism assimilating all that is essential and elevating in the civilization of the East and the West. Our Society never tolerated the idea of cultural isolation, but boldly invited international collaboration in the field of Science and Letters for over a century and a half. It has therefore legitimately earned the title of the National Academy of this vast sub-continent, the cradle of one-fifth of humanity. Granted sufficient repose and resources to carry out our cultural programme, we may hope that with the dawning of durable peace, our Royal Asiatic Society of Bengal will grow into a leading Centre of Intellectual Co-operation in the East collaborating with our sister academies of the West and will vindicate the claims of research in the domain of Truth and Beauty canonized in the Science and Literature of mankind.

APPENDIX I.

List of Publications issued by the Royal Asiatic Society of Bengal during 1943.

(a) Bibliotheca Indica:

	RS. A. P.
(1) Doctrine of Nimbarka, Vol. III, by Dr. Rama Bose	5 0 0

(b) Journal and Proceedings (Third Series):

(1) Vol. IX (Letters), No. 1	14 0 0
(2) " " ("), " 2	4 8 0
(3) " " (Science), " 1	4 0 0
(4) " " (Year-Book)	3 8 0
(5) Title-pages and Indices to Vol. VIII.	

(c) Miscellaneous:

Revised Price List.

Abstract Statement
of
Receipts and Disbursements
of the
Royal Asiatic Society of Bengal
for
the Year 1943

STATEMENT No. 1.

General

Income and Expenditure Account

	Rs.	As.	P.	Rs.	As.	P.
TO ESTABLISHMENT :						
Salaries and Allowances	22,031	7 0			
Commission	235	5 0			
War Allowances	3,774	8 0			
				26,041	4 0	
GENERAL EXPENDITURE :						
Stationery	757	11 0			
Fans and Light	460	8 0			
Telephone	353	9 0			
Taxes	2,387	5 0			
Postage	959	3 0			
Contingencies	841	8 3			
Printing Circulars, etc.	489	11 3			
Audit Fee	250	0 0			
Petty Repairs	16	8 0			
Insurance	792	2 0			
Menials' Clothing	275	5 6			
Furniture and Repairs	206	4 0			
Interest on Security Deposit	5	0 0			
A.R.P. Expenses	436	0 0			
				8,230	11 0	
LIBRARY AND COLLECTIONS :						
Cataloguing	374	3 0			
Honorarium	300	0 0			
Books	727	1 0			
Binding	1,509	1 6			
				2,910	5 6	
Provident Fund Contribution for 1943			615	1 0	
				37,797	5 6	
Transfer to Building Repair Fund Account		1,500	0 0	
SUNDRY ADJUSTMENT :						
Bad Debts written-off		1,423	2 0	
BALANCE AS PER BALANCE SHEET			3,05,078	13 11	
				<u>3,45,799</u>	<u>5 5</u>	

Fund.**1943.**

for the year ended 31st December, 1943.

		Rs.	As.	P.	Rs.	As.	P.
BY BALANCE FROM LAST ACCOUNT			2,89,182	13	11

CASH RECEIPTS :

Interest on Investments	..	..	9,914	14	0		
Interest on Fixed Deposits	..	..	450	0	0		
Advertising	..	..	10,200	0	0		
Rent	..	..	8,855	0	0		
Deposit against rent	..	..	2,625	0	0		
Miscellaneous	..	..	677	6	6		
						32,722	4 6

PERSONAL ACCOUNT :

Members' Subscriptions	..	..	9,971	0	0		
Admission Fees	..	..	1,600	0	0		
Compounding Fees	..	..	610	0	0		
Unclaimed Credit Balances	..	..	24	0	0		
						12,205	0 0
Transfer from A.R.P. Fund A/c	..	..	....			2,005	0 0
Appreciation on Investments re-valued on 31st December, 1943	..	..	....			9,684	3 0

3,45,799 5 5

STATEMENT No. 2.***Oriental Publication***

From a monthly grant made by the Government of Bengal, for the publication (Rs.500, *Less* 20% from the 1st April, 1932), and for the

					Rs.	As.	P.
To	Printing	..	..	..	3,011	5	3
	Binding	..	..	..	77	8	0
	Honorarium	..	..	..	700	0	0
	Balance as per Balance Sheet—			Rs. As. P.			
	Rs.5,000 3% War Loan	..	5,000	0	0		
	Surplus at date	..	16,817	10	6		
					21,817	10	6
					25,606	7	9

STATEMENT No. 3.***Oriental Publication***

From an annual grant made by the Government of Bengal of Historical
(*Less* 20% from the

					Rs.	As.	P.
To	Balance from last Account	..	..	..	11,092	12	7
					11,092	12	7

STATEMENT No. 4.***Sanskrit Manuscripts Fund***

From an annual grant of Rs.3,200 made by the Government of Bengal by the Society; and Rs.3,600 from the same Government

					Rs.	As.	P.
To	Cataloguing	..	..	..	1,177	12	0
	Binding	..	..	..	87	3	0
	Printing	..	..	..	1,016	13	0
	Repairs to MSS.	..	..	..	650	10	3
	Preservation	..	..	..	100	8	0
	Editing	..	..	..	168	0	0
	Balance as per Balance Sheet	..	..	..	17,685	13	9
					20,866	12	0

Fund No. 1, in Account with R.A.S.B. 1943.

cation of Oriental Works and Works of Instruction in Eastern Languages
publication of Sanskrit Works hitherto unpublished, Rs.250.

			Rs.	As.	P.
By	Balance from last Account	.. ..	16,350	7	9
	Annual Grant .. ..	.. ..	7,800	0	0
	Interest realized during the year .. ..	.. ..	112	6	0
	Transfer from A.R.P. Fund Account .. ..	.. ..	1,337	6	0
	Appreciation on investments revalued on 31st December, 1943 .. ..	.. ..	6	4	0
			<hr/>		
			25,606	7	9
			<hr/>		

Fund No. 2, in Account with R.A.S.B. 1943.

Rs.3,000 for the publication of Arabic and Persian Works of
Interest.
(1st of April, 1932.)

			Rs.	As.	P.
By	Annual Grant, 1942, 1943	.. ..	4,800	0	0
	Balance as per Balance Sheet .. ..	.. ..	6,292	12	7
			<hr/>		
			11,092	12	7
			<hr/>		

Account, in Account with R.A.S.B. 1943.

for the publication of the Catalogue of Sanskrit Manuscripts acquired
(Less 20% from the 1st of April, 1932)
for Research Work.

			Rs.	As.	P.
By	Balance from last Account	.. ..	9,440	8	0
	Annual Grant .. ..	.. ..	6,080	0	0
	Transfer from A.R.P. Fund Account .. ..	.. ..	5,346	4	0

20,866 12 0

STATEMENT No. 5. *Arabic and Persian Manuscripts*

From an annual grant of Rs.5,000 made by the Government of India for
by the Society; for the purchase of further Manuscripts,
Manuscripts found in
(Less 50% from 1st April,

				Rs.	As.	P.	Rs.	As.	P.
To	Balance from last Account	..	..	....			1,960	3	3
	Printing	..	..	....			524	12	3
	Binding	..	..	....			168	2	0
							<u>2,653</u>	<u>1</u>	<u>6</u>

STATEMENT No. 6. *Barclay Memorial*

From a sum of Rs.500 odd given in 1896 by the Surgeon
encouragement of Medical

				Rs.	As.	P.	Rs.	As.	P.
To	Balance as per Balance Sheet—								
	Rs.700, 3½% G.P. Notes, 1854-55..			682	15	0			
	Surplus at date	..	..	133	9	8			
							<u>816</u>	<u>8</u>	<u>8</u>
							<u>816</u>	<u>8</u>	<u>8</u>

STATEMENT No. 7. *Servants' Pension Fund*

Founded in 1876 as the Piddington Pension Fund

				Rs.	As.	P.	Rs.	As.	P.
To	Pension	..	..	....			132	0	0
	Balance as per Balance Sheet—								
	Rs.3,000, 3½% G.P. Notes, 1854-55			2,926	14	0			
	Surplus at date	..	..	756	6	8			
							<u>3,683</u>	<u>4</u>	<u>8</u>
							<u>3,815</u>	<u>4</u>	<u>8</u>

STATEMENT No. 8. *Annandale Memorial Fund*

From donations by subscription,

				Rs.	As.	P.	Rs.	As.	P.
To	Cost of a Medal	..	..	....			343	6	0
	Balance as per Balance Sheet—								
	Rs.4,000, 3½% G.P. Notes, 1854-55			3,902	8	0			
	Surplus at date	..	..	696	6	9			
							<u>4,598</u>	<u>14</u>	<u>9</u>
							<u>4,942</u>	<u>4</u>	<u>9</u>

Fund Account, in Account with R.A.S.B

1943.

the cataloguing and binding of Arabic and Persian Manuscripts, acquired and for the preparation of notices of Arabic and Persian various Libraries in India. 1939,)

	Rs.	As.	P.	Rs.	As.	P.
By Annual Grant		2,500	0	0
Balance as per Balance Sheet		153	1	6
				<hr/>	<hr/>	<hr/>
				2,653	1	6

Fund Account, in Account with R.A.S.B.

1943.

General, I.M.S., for the foundation of a medal for the and Biological Science.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account		767	5	8
Interest realized during the year		24	4	0
Appreciation on Investments revalued on 31st December, 1943		24	15	0
				<hr/>	<hr/>	<hr/>
				816	8	8

Account, in Account with R.A.S.B.

1943.

with Rs.500 odd from the Piddington Fund.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account		3,603	10	8
Interest realized during the year		104	12	0
Appreciation on Investments revalued on 31st December, 1943		106	14	0
				<hr/>	<hr/>	<hr/>
				3,815	4	8

Account, in Account with R.A.S.B.

1943.

started in 1926.

	Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account		4,661	4	9
Interest realized during the year		138	8	0
Appreciation on Investments revalued on 31st December, 1943		142	8	0
				<hr/>	<hr/>	<hr/>
				4,942	4	9

STATEMENT No. 9. *Permanent Library Endowment*

From gifts received,

	Rs.	As.	P.	Rs.	As.	P.
To Balance as per Balance Sheet—						
Rs.14,000, 3½% G.P. Notes, 1854-55	13,658	12	0			
Surplus at date	4,204	7	8			
				17,863	3	8
				17,863	3	8

STATEMENT No. 10. *Sir William Jones Memorial*

From a sum gifted for the purpose in

	Rs.	As.	P.	Rs.	As.	P.
To Balance as per Balance Sheet—						
Rs.3,000, 3½% G.P. Notes, 1854-55	2,926	14	0			
Surplus at date	568	3	0			
				3,495	1	0
				3,495	1	0

STATEMENT No. 11. *Pramathanath Bose Memorial*

From a sum gifted for

	Rs.	As.	P.	Rs.	As.	P.
To Balance as per Balance Sheet—						
Rs.800, 3½% G.P. Notes, 1842-43 } „ 1,000, „ „ 1865 }	1,756	2	0			
Surplus at date	456	4	0			
				2,212	6	0
				2,212	6	0

STATEMENT No. 12. *Joy Gobind Law Memorial*

From a donation for the purpose

	Rs.	As.	P.	Rs.	As.	P.
To Balance as per Balance Sheet—						
Rs.3,000, 3½% G.P. Notes, 1854-55	2,926	14	0			
Surplus at date	208	8	0			
				3,135	6	0
				3,135	6	0

Fund Account, in Account with R.A.S.B.

1943.

started in 1926.

	Rs. As. P.	Rs. As. P.
By Balance from last Account	16,875 7 8
Interest realized during the year	489 0 0
Appreciation on Investments revalued on 31st December, 1943	498 12 0
		<hr/> 17,863 3 8

Fund Account, in Account with R.A.S.B.

1943.

1926, by Dr. U. N. Brahmachari.

	Rs. As. P.	Rs. As. P.
By Balance from last Account	3,283 7 0
Interest realized during the year	104 12 0
Appreciation on Investments revalued on 31st December, 1943	106 14 0
		<hr/> 3,495 1 0

Fund Account, in Account with R.A.S.B.

1943.

the purpose in 1935.

	Rs. As. P.	Rs. As. P.
By Balance from last Account	2,102 5 0
Interest realized during the year	45 15 0
Appreciation on Investments revalued on 31st December, 1943	64 2 0
		<hr/> 2,212 6 0

Fund Account, in Account with R.A.S.B.

1943.

in 1929, by Dr. Satya Churn Law.

	Rs. As. P.	Rs. As. P.
By Balance from last Account	2,923 12 0
Interest realized during the year	104 12 0
Appreciation on Investments revalued on 31st December, 1943	106 14 0
		<hr/> 3,135 6 0

STATEMENT No. 13. *Calcutta Science Congress Prize*

	Rs.	As.	P.	Rs.	As.	P.
To Balance as per Balance Sheet—						
Rs.3,000, 3½% G.P. Notes, 1854-55	2,926	14	0			
Surplus at date	611	6	7			
				3,538	4	7
				3,538	4	7

STATEMENT No. 14.

Dr. Brühl Memorial

From a sum gifted for the purpose in

	Rs.	As.	P.	Rs.	As.	P.
To Cost of a Medal .. ..	....			9	10	0
Balance Sheet—						
Rs.1,000, 3½% G.P. Notes, 1854-55	975	10	0			
Surplus at date	246	1	0			
				1,221	11	0
				1,231	5	0

STATEMENT No. 15.

Dr. Bimala Churn Law

From a sum Gifted for the purpose

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation, on Investments revalued on 31st December, 1943 ..	....			195	0	0
Balance as per Balance Sheet—						
Rs.8,000, 3½% G.P. Notes, 1865..	7,805	0	0			
Surplus at date	465	0	0			
				8,270	0	0
				8,465	0	0

STATEMENT No. 16.

Sarat Ch. Roy Medal

From a sum Gifted

	Rs.	As.	P.	Rs.	As.	P.
To Balance as per Balance Sheet			4,250	0	0
				4,250	0	0

Fund Account, in Account with R.A.S.B.

1943.

	Rs. As. P.	Rs. As. P.
By Balance from last Account	3,326 10 7
Interest realized during the year	104 12 0
Appreciation on Investments revalued on 31st December, 1943..	106 14 0
		<hr/> 3,538 4 7 <hr/>

Fund Account, in Account with R.A.S.B.

1943.

1929, by the Brühl Farewell Committee.

	Rs. As. P.	Rs. As. P.
By Balance from last Account	1,160 15 0
Interest realized during the year	34 12 0
Appreciation on Investments revalued on 31st December, 1943	35 10 0
		<hr/> 1,231 5 0 <hr/>

Gold Medal Fund Account, in Account with R.A.S.B. 1943.

by Dr. B. C. Law.

	Rs. As. P.	Rs. As. P.
By Investment Account—		
Amount received from Dr. B. C. Law as Donation $3\frac{1}{2}\%$ G.P. Notes, 1865	8,000 0 0
Cash Donation	465 0 0
		<hr/> 8,465 0 0 <hr/>

Fund Account, in Account with R.A.S.B.

1943.

by Mrs. S. C. Roy for the purpose.

	Rs. As. P.	Rs. As. P.
By Donation received during the year	4,250 0 0
		<hr/> 4,250 0 0 <hr/>

STATEMENT No. 17.

Building Repair

		Rs. As. P.	Rs. As. P.
To Repairs during the year	370 9 6
Balance as per Balance Sheet	6,411 2 6
			<u>6,781 12 0</u>

STATEMENT No. 18.

Provident Fund

From contributions by the

		Rs. As. P.	Rs. As. P.
To Payments during the year ..	..	....	2,363 12 4
Cost of a stamp ..	..	....	0 1 0
Balance as per Balance Sheet—			
Rs. 6,000, 3½% G.P. Notes, 1900–01		5,853 12 0	
Rs. 5,200, 3% G.P. Notes, 1963–65		5,148 0 0	
Savings Bank and Advances ..	..	8,112 10 0	
		<u>19,114 6 0</u>	
			<u>21,478 3 4</u>

STATEMENT No. 19.

Advances Account,

		Rs. As. P.	Rs. As. P.
To Balance from last Account	3,522 0 0
Payments during the year	1,229 0 0
			<u>4,751 0 0</u>

Fund Account, in Account with R.A.S.B.

1943.

	Rs. As. P.	Rs. As. P.
By Balance from last Account	5,281 12 0
Transfer from R.A.S.B. General Fund	1,500 0 0
		<hr/>
		6,781 12 0
		<hr/>

Account, in Account with R.A.S.B.

1943

Society and its Staff.

	Rs. As. P.	Rs. As. P.
By Balance from last Account ..	....	19,363 9 4
Interest realized during the year ..	86 1 0	
Staff Contribution for the year ..	615 1 0	
Society's Contribution for the year ..	615 1 0	
	<hr/>	1,316 3 0
Interest realized from Savings Bank ..	....	405 15 0
Appreciation on Investments revalued on 31st December, 1943 ..	....	392 8 0
		<hr/>
		21,478 3 4
		<hr/>

in Account with R.A.S.B.

1943.

	Rs. As. P.	Rs. As. P.
By Refunds during the year	2,095 0 0
Balance as per Balance Sheet	2,656 0 0
		<hr/>
		4,751 0 0
		<hr/>

STATEMENT No. 20.

Personal

		Rs. As. P.	Rs. As. P.
To Balance from last Account	..	....	3,941 11 6
Advances	..	....	3,098 6 10
Unclaimed Credit Balances written back	..	24 0 0	
R.A.S.B.'s Subscriptions, etc.	..	12,181 0 0	
Book Sales, etc.	..	6,029 2 0	
			18,234 2 0

25,274 4 4

STATEMENT No. 21.

Publication Fund Account,

		Rs. As. P.	Rs. As. P.
To Books returned	33 3 0
Journal and Proceedings	5,302 4 3
Balance as per Balance Sheet	11,202 6 6
			16,537 13 9

STATEMENT No. 22.

A.R.P. Fund Account,

From a sum donated by His Excellency the Governor of Bengal in
Members of

		Rs. As. P.	Rs. As. P.
To Refund	5 0 0
Transfer to General Fund	2,005 0 0
„ to Oriental Publication Fund	
No. 1 Account	1,337 6 0
„ to Sanskrit Manuscript Fund	
Account	5,346 4 0
			8,693 10 0

1944]

Receipts and Disbursements.

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*Account.**1943.*

		Rs.	As.	P.	Rs.	As.	P.
By Cash Receipts during the year			18,980	12	10
Books returned			33	3	0
Bad Debts written off, R.A.S.B.			1,423	2	0
Balance as per Balance Sheet			4,837	2	6

Outstandings.	Amount due to the Society.			Amount due by the Society.		
	Rs.	As.	P.	Rs.	As.	P.
Members	3,306	0	0	488	13	0
Subscribers, etc.	2,008	1	6	10	2	6
Bill Collector's						
Deposit	...	...	...	10	0	0
Miscellaneous	204	13	0	8	12	6
	5,518	14	6	681	12	0

25,274 4 4
*in Account with R.A.S.B.**1943.*

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account	..	....			7,394	5	3
Government Grant	..	....			1,600	0	0
Book Sales, etc.	..	6,029	2	0			
Cash Sale of Publications	..	1,514	6	6			
					7,543	8	6
					16,537	13	9

*in Account with R.A.S.B.**1943.*

1942 and contributions made by the Government of Bengal and the Society.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			8,352	10	0
Contributions received during the year			341	0	0

8,693 10 0

STATEMENT No. 23. Discussion Meeting Fund Running

From sale proceeds

	Rs.	As.	P.	Rs.	As.	P.
To Balance from last Account			53	14	0
Contingent charges (tea, etc.)			498	0	3
				<u>551</u>	<u>14</u>	<u>3</u>

STATEMENT No. 24. (1) Deposit Account (Savings Bank

	Rs.	As.	P.	Rs.	As.	P.
To Balance from last Account ..	....			5,232	5	4
Deposit of Interest realized from loans during the year ..	86	1	0			
Deposit of Contributions during the year ..	1,230	2	0			
Deposit of Advances returned ..	2,095	0	0			
				<u>3,411</u>	<u>3</u>	<u>0</u>
Interest for the year ..	....			405	15	0
				<u>9,049</u>	<u>7</u>	<u>4</u>

STATEMENT No. 25. (2) Deposit Account (Fixed Deposit

	Rs.	As.	P.	Rs.	As.	P.
To Balance from last Account			30,000	0	0
				<u>30,000</u>	<u>0</u>	<u>0</u>

Account, in Account with R.A.S.B.

1943.

of Tickets.

		Rs.	As.	P.	Rs.	As.	P.
By Sale of Tickets			245	0	0
Balance as per Balance Sheet			306	14	3
					551	14	3

Deposit with Imperial Bank of India).

1943.

		Rs.	As.	P.	Rs.	As.	P.
By Withdrawal for Staff Advances, etc.			3,592	12	4
Cost of a stamp			0	1	0
Balance as per Balance Sheet			5,456	10	0

 9,049 7 4

with Imperial Bank of India).

1943.

		Rs.	As.	P.	Rs.	As.	P.
By Balance as per Balance Sheet			30,000	0	0
					30,000	0	0

STATEMENT No. 26.

(3) Investments

	Rs.	As.	P.
To Balance from last Account	3,15,237	6	0
Received during the year	8,000	0	0
Appreciation Investments revalued on 31-12-1943 ..	11,081	6	0
	3,34,318	12	0

Face Value Rs.	FUNDS.	Rate @ Rs. %	31st December, 1943, Valuation.		31st December, 1942, Valuation including *re-cpts during the year.		Appreciation or *Depreciation.	
			Rs.	A. P.	Rs.	A. P.	Rs.	A.
	ROYAL ASIATIC SOCIETY OF BENGAL.							
	PERMANENT RESERVE.							
16,700	3½% G.P. Notes, 1842-43	}						
1,53,700	3½% G.P. Notes, 1854-55							
44,800	3½% G.P. Notes, 1865							
6,000	3½% G.P. Notes, 1879							
33,000	3½% G.P. Notes, 1900-01							
2,53,700								
500	3% G.P. Notes, 1896-97	97 9/- 84 12/-	2,47,516 423	1 0 12 0	2,38,478 403	0 0 12 0	9,038 20	1 0 0 0
	TEMPORARY RESERVE.							
12,000	3½% G.P. Notes, 1900-01	97 9/-	11,707	8 0	11,280	0 0	427	8 0
11,400	4½% Loan, 1955-60	115 10/-	13,181	4 0	12,988	14 0	192	6 0
5,000	3% War Loan, 1951-54	100 0/-	5,000	0 0	4,193	12 0	6	4 0
	ORIENTAL PUBLICATION FUND No. 1.							
5,000	3% War Loan, 1951-54	100 0/-	5,000	0 0	4,993	12 0	6	4 0
	BARCLAY MEMORIAL FUND.							
700	3½% G.P. Notes, 1854-55	97 9/-	682	15 0	658	0 0	24	15 0
	SERVANTS' PENSION FUND.							
3,000	3½% G.P. Notes, 1854-55	97 9/-	2,926	14 0	2,820	0 0	106	14 0
	ANNANDALE MEMORIAL FUND.							
4,000	3½% G.P. Notes, 1854-55	97 9/-	3,902	8 0	3,760	0 0	142	8 0
	PERMANENT LIBRARY ENDOWMENT FUND.							
14,000	3½% G.P. Notes, 1854-55	97 9/-	13,658	12 0	13,160	0 0	498	12 0
	SIR WILLIAM JONES MEMORIAL FUND.							
3,000	3½% G.P. Notes, 1854-55	97 9/-	2,926	14 0	2,820	0 0	106	14 0
	PRAMATHANATH BOSE MEMORIAL FUND.							
800	3½% G.P. Notes, 1842-43	97 9/-	1,756	2 0	1,692	0 0	64	2 0
1,000	3½% G.P. Notes, 1865							
	JOY GOBIND LAW MEMORIAL FUND.							
3,000	3½% G.P. Notes, 1854-55	97 9/-	2,926	14 0	2,820	0 0	106	14 0
	CALCUTTA SCIENCE CONGRESS PRIZE FUND.							
3,000	3½% G.P. Notes, 1854-55	97 9/-	2,926	14 0	2,820	0 0	106	14 0
	DR. BRÜHL MEMORIAL FUND.							
1,000	3½% G.P. Notes, 1854-55	97 9/-	975	10 0	940	0 0	35	10 0
	DR. BIMALA CHURN LAW GOLD MEDAL FUND.							
2,000	3½% G.P. Notes, 1865	97 9/-	7,805	0 0	*8,000	0 0	*195	0 0
	PROVIDENT FUND.							
5,200	3% Loan (1963-65)	99 0/-	5,148	0 0	4,969	4 0	178	12 0
6,000	3½% G.P. Notes, 1900-01	97 9/-	5,853	12 0	5,640	0 0	213	12 0
3,40,800			3,34,318	12 0	3,15,237	6 0	11,276	6 0
					*8,000	0 0	*195	0 0

*Account.**1943.*

			Rs. As. P.		
By Balance as per Balance Sheet	..	..	3,34,318	12	0
			<hr/>		
			3,34,318	12	0
			<hr/>		

STATEMENT No. 27.

Cash

For the year ended 31st

To	Rs.	As.	P.	Rs.	As.	P.
Balance from last Account			23,030	11	11
General Fund Account			32,722	4	6
Oriental Publication Fund No. 1 Account			7,912	6	0
Oriental Publication Fund No. 2 Account			4,800	0	0
Sanskrit Manuscripts Fund Account			6,080	0	0
Arabic and Persian Fund Account			2,500	0	0
Barclay Memorial Fund Account			24	4	0
Servants' Pension Fund Account			104	12	0
Annandale Memorial Fund Account			138	8	0
Permanent Library Endowment Fund Account			489	0	0
Sir William Jones Memorial Fund Account			104	12	0
Pramathanath Bose Memorial Fund Account			45	15	0
Joy Gobind Law Memorial Fund Account			104	12	0
Calcutta Science Congress Prize Fund Account			104	12	0
Dr. Brühl Memorial Fund Account			34	12	0
Dr. Bimala Churn Law Gold Medal Fund Account			465	0	0
Sarat Ch. Roy Medal Fund Account			4,250	0	0
Provident Fund Account			1,316	3	0
Advances Account			2,095	0	0
Personal Account			18,980	12	10
Publication Fund Account			3,114	6	6
A.R.P. Fund Account			341	0	0
Discussion Meetings Fund Running Account			245	0	0
Savings Bank Deposit Account, Imperial Bank of India, Calcutta			3,592	12	4
				<u>1,12,597</u>	<u>0</u>	<u>1</u>

1944]

Receipts and Disbursements.

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Account.

1943.

December, 1943.

By	Rs. As. P.	Rs. As. P.
General Fund Account	37,797 5 6
Oriental Publication Fund No. 1 Account	3,788 13 3
Sanskrit Manuscripts Fund Account	3,180 14 3
Arabic and Persian Manuscripts Fund Account	692 14 3
Servants' Pension Fund Account	132 0 0
Annandale Memorial Fund Account	343 6 0
Dr. Brühl Memorial Fund Account	9 10 0
Building Repair Fund Account	370 9 6
Provident Fund Account	2,363 12 4
Advances Account	1,229 0 0
Personal Account	3,098 6 10
Publication Fund Account	5,302 4 3
A.R.P. Fund Account	5 0 0
Discussion Meetings Running Account	498 0 3
Savings Bank Deposit Account, Imperial Bank of India	3,411 3 0
Balance as per Balance Sheet—		
In hand	51 10 6
With the Imperial Bank of India, on Current Account	50,322 2 2

1,12,597 0 1

STATEMENT No. 28.

Balance

As at 31st

LIABILITIES.

	Rs.	As.	P.	Rs.	As.	P.
General Fund Account	3,05,078	13	11		
Oriental Publication Fund No. 1 Account	21,817	10	6		
Sanskrit Manuscripts Fund Account	17,685	13	8		
Barclay Memorial Fund Account	816	8	9		
Servants' Pension Fund Account	3,683	4	8		
Annandale Memorial Fund Account	4,598	14	9		
Permanent Library Endowment Fund Account	17,863	3	8		
Sir William Jones Memorial Fund Account	3,495	1	0		
Pramathanath Bose Memorial Fund Account	2,212	6	0		
Joy Gobind Law Memorial Fund Account	3,135	6	0		
Calcutta Science Congress Prize Fund Account	3,538	4	7		
Dr. Brühl Memorial Fund Account	1,221	11	0		
Dr. Bimala Churn Law Gold Medal Fund Account	8,270	0	0		
Sarat Ch. Roy Medal Fund Account	4,250	0	0		
Building Repair Fund Account	6,411	2	6		
Provident Fund Account	19,114	6	0		
Publication Fund Account	11,202	6	6		
Personal Account—Sundry Liabilities	681	12	0		
		<u>4,35,076</u>	<u>13</u>	<u>6</u>		

We have examined the above Balance Sheet and the appended detailed accounts with the Books and Vouchers presented to us and certify that they are in accordance therewith, and, in our opinion, set forth correctly the position of the Society as at 31st December, 1943.

PRICE, WATERHOUSE, PEAT & Co.,

Calcutta,
29th January, 1944.

Auditors,
Chartered Accountants,
Registered Accountants.

Sheet.

1943.

December, 1943.

ASSETS.					
				Rs. As. P.	Rs. As. P.
Oriental Publication Fund No. 2 Account				6,292 12 7	
Arabic and Persian Manuscripts Fund Account	..	..	..	153 1 6	6,445 14 1
				<hr/>	
Advances Account	..	..	..	2,656 0 0	
Personal Account—Sundry Outstandings	..	..	..	5,518 14 6	8,174 14 6
				<hr/>	
Discussion Meetings Fund Running Account				....	306 14 3
Deposits :—					
Savings Bank Deposit Account, Imperial Bank of India	..	..	..	5,456 10 0	
Fixed Deposit Account, Imperial Bank of India	..	..	..	30,000 0 0	35,456 10 0
				<hr/>	
Investments Account	..	..	..	.....	3,34,318 12 0
Cash Account :—					
In hand	..	..	..	51 10 6	
With the Imperial Bank of India, on Current Account	..	..	..	50,322 2 2	50,373 12 8
				<hr/>	
					<hr/>
					4,35,076 13 6
					<hr/>

C. W. GURNER,
Honorary Treasurer.

[APPENDIX III.]

Abstract Proceedings, Council, 1943.

(Rule 48 f.)

ANNIVERSARY (160th).—Letter from Dr. N. P. Chakravarti, Dy. Director of Archaeology in connection with the celebration of the 160th Anniversary of the Society. Approve proposal for the celebration of the 160th Anniversary of the Society in February 1944.

A committee, consisting of the *ex-officio* members, Dr. M. N. Saha, Dr. S. K. Chatterji, Dr. M. Z. Siddiqi, Dr. R. C. Majumdar, Dr. J. B. Grant, Dr. S. L. Hora, Mr. Justice Edgley and Mr. W. D. West be constituted with power to co-opt additional members, if necessary, to work out the details of the celebrations and prepare a programme for consideration of the Council. Council No. 6. 19-4-43.

Recommendations of the 160th Anniversary Special Committee of 14-5-43. At the outset, the General Secretary, submitted to the meeting letters received by him, containing resolutions of the Indian Science Congress Association, 30th Session, Calcutta (1943), in connection with the 160th Anniversary of the Society, from the Deputy Director-General of Archaeology, dated the 24th February, 1943, and from the General Secretary of the Indian Science Congress Association, dated the 4th May, 1943, together with a letter dated the 7th May, 1943, from Mr. W. D. West, a member of the Committee.

After discussion at length, the Committee felt that the 160th Anniversary of the Society be celebrated in some form or other in 1944 in view of the resolution adopted by the Council at their last meeting on the 19th April; but owing to the abnormal conditions existing at the present time it is not desirable to have the celebration on a grand scale in January 1944. The celebration should be postponed till January 1946, which would be suitable, as in that year falls the bi-centenary of the birth of Sir William Jones. Meanwhile preparations for the celebration in 1946 may be taken up.

It was resolved to submit the following programme for the celebration in 1944 for consideration of the Council:—

- (1) A series of lectures should be started, the first of which be on the 15th January, 1944, being the day of the 160th Anniversary of the Society, specially bearing on the life and work of such distinguished scholars, like Sir William Jones, James Prinsep, and such other illustrious men as had identified themselves with the Society's work during the last 160 years.
- (2) In conformity with the decision of the Council in 1941 to commemorate the centenary of James Prinsep, a medal or a prize, to be called after him, should be instituted by the Society to be awarded annually or biennially, for meritorious contributions to the study of Ancient Indian History, including epigraphy and archaeology. An attempt should also be made to raise funds, but a medal or a prize would be decided upon after sufficient amount has been collected for the purpose.
- (3) That a Commemoration Volume should be published showing the progress of scientific research in the domains of archaeology epigraphy, numismatics, linguistics, natural sciences,

etc., during the last 60 years subsequent to the publication of the Centenary Volume in 1984. The slips that have been prepared for publication of the Commemoration Volume for the 150th Anniversary, in 1934, should be supplemented by further slips containing the publications issued by the Society up to date.

Council order: Accept with modification in dates to synchronize with the bi-centenary of the Founder's birth. Council No. 5. 19-5-43.

Letter from Dr. S. K. Chatterji, dated 17 Nov., suggesting that Prof. Lo Ch'ang P'ei, Professor at the National University of Peking, be invited to attend the 160th Anniversary of the Society as a representative of the Academia Sinica. Invite. Council No. 20. 19-11-43.

The question of celebrating the 160th Anniversary of the foundation of the Society. Council Order: (1) Letter to be addressed to His Excellency the Governor of Bengal inviting him to preside over the meeting. (2) Letter to Prof. A. V. Hill requesting him to deliver a special lecture on the 2nd February, 1944, on the Royal Society on the occasion of the 160th Jubilee of the Royal Asiatic Society of Bengal. No. 20. 20-12-43.

The President reported receipt of a letter from Prof. A. V. Hill, Secretary of the Royal Society, London, dated 18-11-43, transmitting greetings to the Royal Asiatic Society of Bengal from the President of the Royal Society dated 28-10-43. He also reported that a suitable acknowledgment has been forwarded to Prof. Hill on behalf of the Society. Council Order: Record. (a) Dr. Saha be requested to make arrangements with Prof. Hill for his lecture to be delivered in the Society on Wednesday, the 2nd February, 1944. (b) Mr. N. R. Sarkar be thanked for kindly offering hospitality on behalf of the Society to Prof. Hill. No. 21. 20-12-43.

ANNUAL MEETING.—Enquiry from Government House whether the date of the Annual meeting can be changed from 1st February to any other date. Council Order: A polite letter be written to the Private Secretary to H.E. The Governor of Bengal pointing out that the Council have no power to fix the date of the Annual Meeting otherwise than in accordance with Rule 58(a). No. 14. 14-1-43.

Letter, dated 22-1-43, from the Additional Secretary to H.E. The Governor of Bengal addressed to the President, R.A.S.B., regarding the Annual Meeting in 1943. Record. It was resolved that the expedient adopted in 1937 was contrary to the Rules of the Society (58(a)) and should not be repeated. Special Council No. 1. 22-1-43.

The question of inviting the Acting Governor of Bengal to preside over the Annual Meeting in February, 1944. Invite. Council No. 12. 20-12-43.

ANNUAL REPORT.—Draft Annual Report of the Society for 1942. Approved with amendments. 150 copies only be printed for distribution at the Annual Meeting. Council No. 9. 14-1-43.

A.R.P. MEASURES.—Report payment to Messrs. Thos. Cook and Sons of their bill for removing packages containing publications to Nagpur—Rs.365-1-0. Payment approved. Fin. Com. No. 2. 14-1-43.

Report by the General Secretary of the action taken by him during the emergency period. Approved. It was also resolved that none of the menial staff who ran away and were dismissed should be re-appointed and that those who have been employed during the emergency period be appointed permanently. An effort also should be made to do with a smaller menial staff so that higher wages will not result in an increase in the amount formerly expended. Council No. 12. 14-1-43.

Estimate for erecting baffle walls, making a shelter room, etc., as A.R.P. measures from the Engineer to the Calcutta Improvement Trust. Accept the estimate, and the work to be taken in hand at once, meeting the cost from the General Fund for the present. A printed circular to be sent to all the members intimating them that the A.R.P. Fund started in 1942 will be closed towards the end of June, 1943. Fin. Com. No. 2. 19-4-43.

The ten paintings kept at the Government House at Darjeeling by the Lady Mary Herbert on behalf of the Society. Write to the Military Secretary to the present Governor concerning them with a view to get an undertaking from him with regard to the safety of the paintings. Council No. 19. 19-11-43.

Letters to and from the Military Secretary to H.E. The Governor of Bengal with regard to Society's paintings kept in the Government House at Darjeeling. Dr. Kalipada Biswas, Superintendent, Royal Botanic Garden, and a member of the Society, who is now stationed in Darjeeling be requested to inspect the paintings periodically as suggested by the Military Secretary, and the arrangement so made be communicated to the Military Secretary for his information. Council No. 1. 20-12-43.

Closing of the A.R.P. Fund Account started in 1941. The amount of Rs.8,688-10-0 realized as donations towards this fund be allocated proportionately to the following funds out of which the A.R.P. expenses were met:

1. Oriental Publication Fund No.	..	Rs. 1,337-6-0.
2. Sanskrit MSS. Fund	..	Rs. 5,346-4-0.
3. R.A.S.B. General Fund	..	Rs. 2,005-0-0.

Fin. Com. No. 3(c). 20-12-43.

ASSOCIATE MEMBERS.—Letter from Dr. S. K. Chatterji, dated 11-11-43, proposing the names of Mr. B. R. Ray and Rev. F. A. Peter as Associate Members of the Society. Accept the proposals. Propose the names for election to the next Ordinary General Meeting as prescribed in Rule 13. Council No. 17. 19-11-43.

BIBLIOTHECA INDICA.—Appointment of the Chairman and Secretary of the Committee in conformity with Rule No. 63. Chairman: Dr. S. P. Mookerjee. Secretary: Dr. Kalidas Nag. Bib. Ind. Com. No. 1. 14-5-43.

Report on the position of the Society's stock of saleable publications and their valuation prepared by Mr. D. Burman. Dr. N. Dutt be requested to scrutinize the report, after which the matter be brought up with specific proposals for consideration by the next meeting. Pub. Com. No. 3. 19-4-43.

The question of a general policy to be adopted with regard to the printing of works in the Bibliotheca Indica Series which are out of stock. President requested Dr. N. Dutt to read his report on the publications, and after due discussion it was ordered to be circulated with the following recommendations:

(1) Vidhana Parijata which was left incomplete should be discarded; (2) Letter be written to Dr. Yazdani requesting him to complete the Index of Amal-i-Salih, and in case of his inability to do so, the Index be prepared by an assistant of Dr. Siddiqi; (3) Similarly, to write to Pt. M. Kaul of Srinagar to complete his notes and index to Kuttanamatam within two months, and if those be not forthcoming Dr. Dutt be requested to complete the index; (4) Mr. D. C. Chatterjee be requested to submit final copies of Mahavyutpatti to Dr. N. Dutt who announced that he had made definite engagement with him; (5) As regards the MS. of Padmavati now with the Inland Printers, they be asked to procure superior quality

of paper or medium quality if that be not available; (6) With regard to the work entrusted to the late Mr. Van Manen, named Vajjalaggam, his legal heir and Solicitors be approached with a view to recovering MSS., books, etc., if any, lent by the Society.

Suggestions for new publications scrutinized in the light of the detailed report submitted by Dr. Dutt.

Sir Jadunath Sarkar suggested that in case of taking up a new publication he would recommend the revised and critical edition of Ibn Batuta's Travels (Indian section), which has been thoroughly revised by Prof. Mahdi Hossain of the Agra University, and he be requested to send a portion of his work available in print (320 pp. in all). Bib. Ind. Com. No. 2. 14-5-43.

Report by Dr. Nalinaksha Dutt, Philological Secretary, on the Society's Bibliotheca Indica Series, etc. consisting of: (a) Co-ordination of Staff. Present arrangement to continue up to 31-1-44. Mr. Burman, appointed to hold charge of the Pub. Dept., to continue on the present terms and Mr. Gupta to act as a clerk in his Dept. Bearers and duffries be taken from the existing staff. (b) Advertisement. Advertisements be inserted in distinguished Oriental Journals. (c) Utilization of funds by Reprints. Ascertain which texts should be reprinted. Enquire whether any edition of the same has already been published elsewhere. Ascertain approximate cost of pending works in the Bibliotheca Indica Series. (d) Padmavati—approval of paper. Accept sample paper though slightly different. (e) Remuneration of Arabic and Persian Cataloguers. General Secretary to negotiate with Dr. A. Imam and Dr. A. B. M. Habibullah and suggest a reasonable figure. (f) Disposal of loose fascs. of incomplete texts at a discount. Dispose of at half price. (g) Selling of books at a general discount on the occasion of the Jubilee. Grant 40% discount to booksellers and to members and 25% to non-members for the period 1st August, 1943 to 31st January, 1944. (h) Constitution of the Bibliotheca Indica Committee. Co-option of three experts be considered at the next meeting. (i) Printing of Astronomy and Philosophy Catalogues, pt. I. Call for rates with specimen pages for remaining portions of the Astronomy and Philosophy Catalogues. (j) Incomplete books. Of the 8 incomplete books (i) Vidhana Parijata be written off. (ii) Philological Secretary to report whether the remaining seven incomplete works are worth completing or not, and whether any of these works have been published elsewhere. (iii) Call for report on the progress of works already allotted. (k) Publication of incomplete works. Noted General Secretary's report that Tirthakalpa and Catalogue of Tantra MSS. have been completed and published, and Kuttanamatam Kavyam and Mahavyutpatti have been completed. Pub. Com. No. 1. 16-7-43.

Letter from Prof. N. C. Vedantatirtha requesting payment of editing fee for Sanskrit MS. Catalogue—Philosophy, which is in the press. Pay for the present editing fee of Rs.1-8-0 per page for the 112 pages already print-ordered; enquire from the printers as to the period within which they would finish printing the complete volume. Fin. Com. No. 1. 24-8-43.

Plan of completing the set of old publications with some fascicles now out of print. Enquire the advisability of publishing a revised edition of Astasāhasrika Pragnāpāramita from Drs. N. Dutt and P. C. Bagchi. Bib. Ind. Com. No. 3. 6-9-43.

Revised edition of publications now out of print but still in demand. List of books out of print analyzed. Revised edition of Vols. II and III of Ain-i-Akbari to be undertaken under the editorship of Sir Jadunath Sarkar. Bib. Ind. Com. No. 4. 6-9-43.

Mr. Dugin's letter requesting the Society to undertake the publication of 'Mirasadul-Ibad'. Mr. Dugin be replied that (1) the book has already been printed, and (2) no photostat copies of MSS. can be procured from England at the present time. Bib. Ind. Com. No. 5. 6-9-43.

Letter from Dr. B. Prashad regarding the completion of Maathir-ul-Umara. Record with thanks to Dr. Prashad. Bib. Ind. Com. No. 7. 6-9-43.

The question of printing the Ain-i-Akbari, Vols. II and III. It was resolved to recommend to the Council for taking up the printing of the revised edition of Vols. II and III of the Ain-i-Akbari and to entrust the work of editing to Sir Jadu Nath Sarkar who has volunteered to undertake it for the Society. On the proposal of Prof. Haq a vote of thanks to Sir Jadu Nath Sarkar was recorded for his generous offer. It was decided to entrust the work of printing when the press-copy is ready to Messrs. The General Printers and Publishers, Ltd., Calcutta, whose quotation has been found to be the lowest. Bib. Ind. Com. No. 1. 25-10-43.

The question of taking up the publication of Lalitavistara as suggested by Dr. B. C. Law. Recommend to the Council for printing, in the first instance, English Translation, based upon the recent revised texts. Bib. Ind. Com. No. 3. 25-10-43.

Report on completion of printing of Doctrine of Nimbarka (the book is in 3 volumes). Record. Bib. Ind. Com. No. 4. 25-10-43.

Report on completion of printing of Vajjalaggam. Issue after printing the Introduction. Bib. Ind. Com. No. 5. 25-10-43.

It was also recommend to the Council that a fascicle of Haft-Iqlim (Persian text) be issued under the editorship of Prof. Mahfuz-ul Haq in continuation of the last printed fascicle (namely the third), contained in that section. Bib. Ind. Com. No. 6. 25-10-43.

CATALOGUES.—Report on the Descriptive Catalogue of Sans. MSS., Vol. VIII, and a letter from the editor, Prof. C. Chakravarti, with regard to its introduction. (a) The Introduction and Contents be inserted in the Tantra Catalogue already published. (b) Prof. Chakravarti be informed that, in view of the recent correspondence with the Govt. of Bengal regarding grants for the preservation, cataloguing, etc. of Sanskrit MSS., and of the earlier volumes still remaining unpublished, the Publication Committee rescinds its previous decision with regard to the editing of the Miscellaneous volumes (Vols. XIII and XIV) of the Catalogues entrusted to him. Pub. Com. No. 4. 19-4-43.

The question of fixing rates for printing Sanskrit MSS. catalogues. Obtain estimates from other presses and bring the matter for consideration by the next meeting. Pub. Com. No. 1. 6-9-43.

Materials for a Supplement to the Catalogue of Vernacular MSS. in the Society's collection prepared by Mr. Prafulla Chandra Pal. To be printed. Pub. Com. No. 7. 17-12-43.

Letter from Dr. M. Z. Siddiqi, Joint Philological Secretary, dated 21-8-43, suggesting the fixing of remuneration for cataloguing the Arabic and Persian manuscripts at Rs.5 per printed page. Refer to the Bibliotheca Indica Committee for consideration. Council No. 13. 24-8-43.

Report of Jt. Phil. Secretary on the rate for cataloguing the Persian and Arabic MSS. Accept the recommendation, Rs.5 per printed page. Bib. Ind. Com. No. 2. 6-9-43.

Consideration of the note for cataloguing the Arabic MSS. referred back by the Council for the consideration of the Finance Committee. Accept the Jt. Phil. Secretary's recommendation. Rs.5 per printed page. Fin. Com. No. 2. 25-10-43.

The General Secretary placed before the meeting the joint letter from Drs. Imam and Habibullah regarding Islamic MSS. cataloguing work. Jt. Phil. Secretary recommended acceptance of terms of the cataloguers referring to the next Bibliotheca Indica Committee to settle details of work. Accept Dr. Siddiqi's recommendation. Council No. 22. 20-12-43.

COUNCIL.—Letter from Mr. C. W. Gurner, Honorary Treasurer, intimating absence from Calcutta for a month from 19-4-43 and requesting arrangement to be made to carry on his duties during the absence. The Hon'ble Mr. Justice Edgley be authorized to officiate as Honorary Treasurer during the absence of Mr. Gurner, from Tuesday, the 20th April, 1943, until notification of his return to Calcutta and resumption of office. Fin. Com. No. 4. 19-4-43.

Letter, dated 11-4-43, from the Library Secretary, Dr. S. L. Hora (referred to the Council by the Library Committee). (a) Accept the resignation of Dr. Hora as Library Secretary and thank him for the services rendered by him to the Society as such. (b) Dr. R. C. Majumdar, Hist. and Arch. Secretary, be appointed Library Secretary along with his own duties in place of Dr. Hora, who will remain a member of Council subject to confirmation by the Ordinary General Meeting as prescribed in Rule 46. Council No. 8. 19-4-43.

Letter from Dr. B. C. Law resigning his seat on the Council and Committees of the Society. Dr. Law be requested to withdraw his resignation. Council No. 14. 19-5-43.

Letter from Dr. B. C. Law withdrawing his letter of resignation. Record. Council No. 10. 21-6-43.

Consideration of composition of Council for 1944-45. Resolved that the following names be declared as Council candidates for election to next year's Council, and that the list be ordered to be issued to the Resident Members as prescribed in Rule 44:

President	..	..	Dr. S. P. Mookerjee.
Vice-President	..	..	Dr. M. N. Saha.
"	..	..	Dr. S. C. Law.
"	..	..	The Hon'ble Mr. Justice N. G. A. Edgley.
"	..	..	Dr. R. C. Majumdar
General Secretary	..	..	Dr. Kalidas Nag.
Treasurer	..	..	Mr. C. W. Gurner.
Philological Secretary	..	..	Dr. N. Dutt.
Joint Philological Secretary	..	..	Dr. M. Z. Siddiqi.
Biological Secretary	..	..	Dr. S. P. Agharkar.
Physical Science Secretary	..	..	Dr. K. N. Bagchi.
Anthropological Secretary	..	..	Dr. W. G. Griffiths.
Hist. and Archaeological Secretary	..	..	Dr. B. C. Law.
Medical Secretary	..	..	Dr. J. B. Grant.
Library Secretary	..	..	Dr. R. C. Majumdar.
Member of Council	..	..	Dr. S. L. Hora.
"	..	..	Mr. L. R. Fawcus.
"	..	..	Mr. Percy Brown.
"	..	..	Dr. M. Ishaque.
"	..	..	Mr. W. D. West
"	..	..	Mr. K. P. Khaitan.

Council No. 19. 20-12-43.

COMMITTEES.—Constitution of the various Committees of the Society, viz. (a) Library, (b) Publication, (c) Finance, (d) Bibliotheca Indica, and (e) Programme Committees. The Committees be constituted as follows:

Finance: President, General Secretary, Honorary Treasurer (*Ex-officio*), Sir John Lort-Williams, The Hon'ble Mr. Justice N. G. A. Edgley, Dr. S. L. Hora and Mr. Percy Brown. (Chairman: President. Secretary: General Secretary.) Council No. 6. 16-2-43.

Library: President, General Secretary, Honorary Treasurer, Philological, Jt. Philological, Natural History (Biology), Natural History (Physical Science), Anthropological, Historical and Archaeological Medical

and Library Secretaries (*Ex-officio*), Sir John Lort-Williams and Khan Bahadur K. M. Asadullah. Council No. 16-2-43. (Chairman: Dr. R. C. Majumdar; Secretary: Dr. Kalidas Nag. Lib. Com. No. 1. 12-3-43.)

Publication.—President, General Secretary, Honorary Treasurer, Philological, Jt. Philological, Natural History (Biology), Natural History (Physical Science), Anthropological, Historical and Archaeological, Medical and Library Secretaries (*Ex-officio*), Dr. S. K. Chatterji and Dr. B. C. Law. Council No. 6. 16-2-43. (Chairman: Dr. S. P. Mookerjee. Secretary: Dr. N. Dutt. Pub. Com. No. 1. 12-3-43.)

Bibliotheca Indica.—President, General Secretary, Honorary Treasurer (*Ex-officio*), Dr. S. K. Chatterji, Philological and Jt. Philological Secretaries, Dr. B. C. Law, Sir Jadu Nath Sarkar and Dr. M. Ishaque. Council No. 6. 12-3-43.

Co-option of new members on the Bibliotheca Indica Committee as suggested in the Report of Dr. Dutt. Recommend the co-option of Dr. Satkori Mookerjee, Dr. P. C. Bagchi, Prof. M. M. Haq as additional members on the Bibliotheca Indica Committee. Bib. Ind. Com. No. 1. 6-9-43. (Chairman: Dr. S. P. Mookerjee, Secretary: Dr. Kalidas Nag. No. 1. 14-5-43.)

Programme Committee.—President, General Secretary, Honorary Treasurer (*Ex-officio*), Sir John Lort-Williams, The Hon'ble Mr. Justice N. G. A. Edgley, Dr. K. N. Bagchi, Mr. L. R. Fawcett, Dr. W. G. Griffiths, Mr. Percy Brown and Dr. R. C. Majumdar. Council No. 6. 16-2-43. (Chairman: The Hon'ble Mr. Justice N. G. A. Edgley. Secretary: Dr. Kalidas Nag. Prog. Com. No. 1. 12-3-43.)

DISCUSSION MEETINGS.—Report by the General Secretary of over-expenditure in connection with the Discussion Meeting Tea. Recommend to the Council for an additional grant of Rs.100 from the Society's General Fund for 1943. Fin. Com. No. 8. 21-6-43.

Letter from Lt.-Col. C. P. Hancock, O.B.E., Resident for the Eastern States, Calcutta, dated 3-8-43, addressed to the Hon'ble Mr. Justice Edgley. The Hon'ble Mr. Justice Edgley to write to Col. Hancock accepting the offer intimating to him at the same time that the talk should be confined purely to the History of the Indian States avoiding all political issues and that no travelling expenses will be paid to the speaker who may be deputed by the Chamber of Princes. Prog. Com. No. 2. 12-8-43.

Recommendations of the Programme Committee of 5-11-43. Note by the Hon'ble Mr. Justice Edgley on certain proposals contained in a letter addressed to him by Sir Cyril Fox, Kt., dated 29-8-43.

The Committee considered the proposals contained in the note of the Hon'ble Mr. Justice Edgley of 2-9-43, based on the suggestions made in Sir Cyril Fox's letter dated the 29-8-43 and they unanimously recommend the following proposals for adoption by the Council:—(1) That weekly Discussion Meetings be held at 6-30 p.m., instead of fortnightly meetings at 5-30. (2) That Tea will not ordinarily be provided at these meetings except on such occasions as the Programme Committee may regard as special. (3) That the military authorities will ordinarily be asked to provide two speakers every month, the other speakers being arranged as before by the Programme Committee. (4) That it must of course be understood that the subjects chosen for the meetings should not be such as are likely to involve any political or religious controversy. (5) That ordinarily the opener's speech should not exceed half an hour except in the case of subjects illustrated by lantern slides when the duration should not ordinarily exceed 50 minutes. (6) That steps should be taken to give adequate publicity to this branch of the Society's work. Posters should be placed at the gate of the Society and at such other places as may be approved by the Programme Committee. (7) That the military authorities should again be informed that members of the Allied Forces

stationed in and in the vicinity of Calcutta are welcome to make use of the Society's library during the regular office hours. (8) That further lists of such members of the Society who will be prepared to meet the officers and men of the Army be printed and circulated to the various units in Calcutta. (9) That a special effort should be made by the Programme Committee to secure speakers (both military and civilian) who will be able to speak on interesting and attractive subjects of general interest. Council Order: Accept. With regard to the recommendation that Tea will not ordinarily be provided at the Discussion Meetings, it should be changed to: 'If anybody wants Tea, he should give two days' notice to the Superintendent'. Council No. 9. 19-11-43.

Provision of money for meeting contingency expenses in connection with the Discussion Meetings in 1944. Provide a sum of Rs.500 from the General Fund of the Society. Fin. Com. No. 13. 20-12-43.

ELLIOTT PRIZE.—Recommendations of the Trustees of the Elliott Prize for Scientific Research with regard to the awards for 1941 and 1942. Accept the recommendations. Dr. M. C. Nath of the Dacca University be awarded the prize for Chemistry for 1941, and that no prize for Physics be awarded for 1942. Council No. 8. 14-1-43.

EXCHANGES.—Request for an exchange of the Society's Journal with the Journal of the Numismatic Society of India from the Editors of the Journal, Bombay. Exchange with Journal (Letters), beginning with Vol. VI so as to get the Numismatic Journal from Vol. I for the Society's Library. Lib. Com. No. 2. 12-3-43.

Letter, dated 6-2-43, from the Director, Deccan College Post-Graduate and Research Institute, Poona, requesting an exchange of the Society's catalogues of manuscripts with those of the Institute. Decline; the Director be offered 33½% discount on the sale price of the catalogue of manuscripts. Lib. Com. No. 3. 12-3-43.

Request from the Librarian, University of Ceylon, for an exchange of the Society's Journal with the University of Ceylon Review. Grant; exchange with the Letters part of the Journal from 1944. Lib. Com. No. 3. 25-10-43.

Request from the Jt. Hon. Secretary, Geological, Mining and Metallurgical Society of India for an exchange of the Society's Journal with the Quarterly Journal of the Geological, Mining and Metallurgical Society. Grant; exchange with the Science part of the Journal from 1944. Lib. Com. No. 4. 25-10-43.

Request from the Registrar, Calcutta University, for exchange of publications. Grant in respect of publications of all kinds. Lib. Com. No. 2. 17-12-43.

Request from the Chief Editor, Journal of the Ganganatha Jha Research Institute, for an exchange of the Society's Journal with the Quarterly Journal of the Institute. Grant: exchange with the Letters part of the Journal from 1944. Lib. Com. No. 3. 17-12-43.

FELLOWS.—Recommendations of the meeting of the Resident Fellows of 6-1-43. Accept; put up the names of Mr. A. F. M. Abdul Ali and Sir J. C. Ghosh for election at the Annual Meeting in conformity with Nos. 17 and 18 of the 'Regulations regarding the Election of Fellows'. Council No. 7. 14-1-43.

Recommendations of the meeting of the Resident Fellows on 18-6-43. No. 3. The election of Fellows for the year was considered, and it was decided that: (a) For the duration of the war, in order to get the nomination and voting papers from abroad, it be recommended to the Council that the meetings contemplated in Regulations 2 and 8 should be held in February instead of June, and within the fortnight preceding the 7th of August instead of October respectively. (b) Practices followed with

regard to the issuing of Nomination and Voting papers during the last two years should also be placed before the Council for consideration for making the necessary amendments in the relevant Regulations. Council order: Accept. Report the changes in the Fellowship Regulations recommended by the meeting of the Resident Fellows for information of the next Ordinary Monthly Meeting as prescribed in Rule 48(a). No. 12. 21-6-43.

FINANCE.—Recommendations of the Finance Committee of 14-1-43. Accept. With a view to equalize the pay of the permanent bearers with that of the bearers newly appointed, it was resolved to raise the salary of the four permanent bearers from Rs.15 to Rs.16 per month so that their salary and food allowance will total Rs.20. Council No. 4. 14-1-43.

Applications from menials and staff, R.A.S.B., for supply of food materials at reduced rate or an increase in grain allowance in lieu thereof. Purchase rice for a month for distribution to the members of staff at controlled price in the first instance, and prepare a scheme for the future. Fin. Com. No. 4. 16-3-43.

Report on distribution of rice to menials and staff of the Society and consideration of a scheme for the supply of food materials to staff. (a) Distribution of rice to be discontinued for the time being. (b) An additional food allowance of Rs.3 be granted to all employees of the Society drawing a salary of Rs.30 and under with effect from 1-4-43 and the matter be brought up again for review by the next meeting. Fin. Com. No. 3. 19-4-43.

The question of food allowance and a review of the matter as directed by the last Finance Committee (also applications from staff and menials for an increase in food allowance). An extra food allowance of Rs.3 be granted to all employees of the Society for the month of May and the allowance be paid immediately as a measure of relief; the question of food allowance be brought up again for review by the next meeting. Fin. Com. No. 3. 19-5-43.

Application from staff requesting postponement of monthly payments of Provident Fund loans owing to the abnormal rise in price of food materials and other commodities. The period of repayment of existing loans be doubled for the time being. Fin. Com. No. 5. 19-5-43.

A review of food allowance to staff as directed by the last Finance Committee (an application from the employees of the Society). Continue the present arrangement for one month (July) and bring the question again for review by the next meeting. Fin. Com. No. 4. 21-6-43.

A review of the present food situation and the allowance to staff, as directed by the last Finance Committee (applications from the staff and menials regarding enhancement of dearness allowance). Purchase 10 maunds of rice at Rs.30 per maund and distribute to the menial staff at Rs.12 per maund for a month. The question of food allowance be brought up again for review by the next meeting. Fin. Com. No. 4. 29-7-43.

The question of food allowance to the staff and a review of the matter as directed by the last Finance Committee (also application from the Junior staff dated 19-8-43 for enhancement of food allowance). Continue the existing allowance for the present; the matter be brought up again for review by the next meeting. Fin. Com. No. 3. 24-8-43.

The question of food allowance to the staff and a review of the matter as directed by the Finance Committee. (1) The office should furnish Dr. Hora with all recommendations of the Finance Committee and orders of the Council with regard to the granting of food allowance to the staff from the beginning to the present time for information. (2) The food allowance of menials drawing a salary of Rs.34 and under, should be reduced from Rs 10 to Rs.8 only and supplying them with 15 seers of rice

each at the controlled rate of Rs.16 per maund. (3) The clerical staff should continue receiving the existing allowance. (4) The question of food allowance be brought up again for review by the next meeting. Fin. Com. No. 3. 15-9-43.

Review of food situation and consideration of giving ration and dearness allowance to staff of the Society. Continue present arrangements. Supply atta in case rice cannot be procured. On the introduction of the rationing system, the position should be reviewed. Fin. Com. No. 4. 25-10-43.

Review of food situation and supply of ration to menial staff. Continue present arrangements for another month. Supply rice to the menial staff. The matter should be brought up for review by the next meeting. Fin. Com. No. 6(a). 25-11-43.

Review of food allowance and application from menials. Continue the present arrangements for the current month. The question of food allowance be brought up for review by the next meeting. Fin. Com. No. 14. 20-12-43.

Reappropriation of a sum of Rs.250 for the purpose of binding Arabic and Persian MSS. from the budget allotted for general binding. Lend Rs.200 from the Society's General Fund. Fin. Com. No. 5. 16-3-43.

Building repairs. The General Secretary is authorized to proceed with urgent work of repairs to the Society's building, after obtaining estimates from different firms, and the maximum not exceeding Rs.1,000 expenditure be incurred in this connection. Fin. Com. No. 7. 15-9-43.

Question of the provision of 90 flat binders for Journals, etc. at a cost of Rs.200 only. Sanction. Fin. Com. No. 4. 19-11-43.

Supply of winter clothing to menial staff and estimate received from Messrs. Wachel Molla & Co. An amount to the extent of Rs.300 may be sanctioned for the purpose. Fin. Com. No. 7. 25-11-43.

GENERAL LECTURE.—Offer by Dr. B. S. Guha of delivering a General Lecture to the Society on 'Races and Cultures of India' during the first week of February, 1943. Ask Dr. Guha to give a talk on the subject at the Discussion meeting on the 4th February if Mr. Percy Brown will agree to transfer his talk. Prog. Com. No. 1. 19-1-43.

It was decided to request Rao Bahadur K. N. Dikshit to give a talk on the recent excavations at Ramnagar, etc., on Friday, the 20th August, at 5-30 p.m. or any other day convenient to him. Also that Mr. Ramachandran be requested to give an account of his second visit to the Archaeological site at Mainamati. Prog. Com. No. 3. 12-8-43.

In accordance with No. 1 of the Regulations regarding the General Lectures, it was decided to request Dr. S. P. Mookerjee, Dr. Surendra Nath Das-Gupta, Dr. J. B. Grant and Mr. W. D. West to give lectures to the Society during the ensuing winter season, November 1943 to March 1944. Prog. Com. No. 4. 12-8-43.

GRAFLEX PHOTORECORD CAMERA.—Letter from the Keeper of Records, Imperial Records Department, requesting the loan of the microfilm camera for the duration of the war. Intimate that the camera cannot be sent out of Calcutta. Council No. 2. 19-4-43.

Letter from Prof. P. C. Mahalanobis, Director, Statistical Laboratory, Presidency College, offering to house the Society's microfilm camera for the duration of the war, and containing suggestions with regard to making it available for work. Postpone consideration in view of granting Dr. Fox's request for the loan of the camera for a month to the G.S.I. Council No. 1. 19-4-43.

Report on loss of an accessory (Exposure meter) of the Graflex Photorecord Camera lent to the Geological Survey of India. Record statements made by the Superintendent and by the Geological Survey of India regarding the loss and seek the help of the Commissioner of Police. As precaution against recurrence of such serious losses in future, the Superintendent be held responsible, making a complete inventory in a permanent book of all important possessions of the Society with approximate value. Council No. 13. 19-5-43.

Letter from Mr. W. D. West of the Geological Survey of India intimating the willingness of the Director, G.S.I., to meet the entire cost of replacing the missing Exposure meter of the Graflex Photorecord Camera. Thank the Director, G.S.I., for his generous offer. An effort should be made to procure the Exposure meter from the makers of the camera in the U.S.A. Council No. 2. 21-6-43.

Letter from the Director, G.S.I., dated 23-7-43, requesting to be allowed to keep the Graflex Photorecord Camera till the end of August 1943. Allow. Council No. 16. 29-7-43.

Further letter, dated 7-9-43, from the Director, G.S.I., requesting the extension of the period of loan of the Graflex Photorecord Camera till 1-10-43. Grant. Council No. 11. 15-9-43.

Further request from the Director, G.S.I., dated 30-10-43, for the loan of the Society's Graflex Photorecord Camera for some urgent work. Grant for a maximum of one month. Council No. 5. 19-11-43.

GRANTS.—Letter from the Secretary to the Government of Bengal, Department of Education, enquiring whether the two grants might be suspended in view of the scarcity of paper for printing the Sanskrit works and Sanskrit MSS. Catalogues. The General Secretary to draft a suitable reply in consultation with the President, Sir John Lort-Williams and Dr. R. C. Majumdar. Council No. 4. 19-5-43.

INDIAN SCIENCE CONGRESS.—The question of ownership of the publications of the Indian Science Congress Association. A Sub-Committee consisting of the *ex-officio* members, Sir John Lort-Williams, Dr. S. L. Hora and Dr. S. P. Agharkar be constituted to look into the question and report to the Council meeting in November. Council No. 13. 15-9-43.

Note by Dr. S. P. Agharkar. The relations between the Indian Science Congress and the A.S.B. have undergone many changes. These may be shown as follows:—

1914-16. No definite relationship. For each Congress an *ad hoc* Committee was organized by the local Secretary who carried on all business. The A.S.B. agreed to print the Proceedings of the 1st and 3rd Congresses as part of the Journal and Proceedings. The Proceedings of the 2nd Congress were published by the Congress at Madras.

1916. Agreement between the Indian Science Congress and A.S.B. regarding custody of funds of the former by the latter. Mr. S. W. Kemp on behalf of the Science Congress wrote to Dr. F. H. Gravely (General Secretary, A.S.B.) on 19-1-16 requesting the A.S.B. to take charge of the funds of the Indian Science Congress (about one thousand rupees). F. H. Gravely in his letter No. 268, dated 7-2-1916, informed him of the decision of the A.S.B. to take charge of the Congress. The Council on 16-1-16 accepted charge of the money as requested and resolved to keep a separate fund. Mr. Kemp was asked to report in detail to the Council on the proposed connection of the two Societies.

(New rules of the I.S.C. were approved by the A.S.B. Council on 25-4-17.)

On 23-2-17 S. W. Kemp (as Gen. Secy., A.S.B.) circularized the Publication Committee as follows:—‘The accompanying manuscript of the Proceedings of the Ind. Sc. Congress is circulated to the members of the Publication Committee for sanction of printing with the annual report of 1916. The Science Congress has agreed to bear the cost of printing.’ The estimate of the B. M. Press for same, dated 27-2-17, is Rs.453. On 5-3-17, J. L. Simonsen wrote to the Gen. Secy., A.S.B., relating, ‘The Science Congress will willingly pay half the cost incurred in printing the Proceedings’.

(The position appears to have been that the A.S.B. accepted the Proceedings of the Congress as suitable matter for inclusion in their own Proceedings, and supplied reprints to the Ind. Sc. Congress for distribution to their members for which they paid half the cost of printing.)

This arrangement continued for the Proceedings of the 4th to the 6th Sessions. The Council of the A.S.B. could not print the Proceedings of the 7th Congress and so they were published by the Ind. Sc. Congress. The Proceedings of the 8th (Cal. 1921) Session could not be published up to 1922 as there were no funds available with the Congress for the purpose. Eventually, a donation from Sir R. N. Mookerjee, President of the 8th Session, enabled publication.

The Proceedings of the 9th Session (Madras 1922) were published as a part of the Proceedings of the A.S.B. on the 50 : 50 basis.

From the 10th (Lucknow 1923) Session the Congress Proceedings were published separately, though the A.S.B. still paid half the cost. The Congress Proceedings were not sent to all members of the A.S.B., but were supplied to such members as asked for these.

The Proceedings of the 11th to 14th Sessions (1924–1927). As the Congress was becoming a larger body its Proceedings were becoming bulkier and the A.S.B. had to pay a larger share which was Rs.800 in the year 1927.

The finances of the Science Congress having improved in the meanwhile owing to the increase in membership and the large subventions and grant-in-aid received from the Indian Universities and the Indian Institute of Science, Bangalore, the Council of the A.S.B. resolved to charge the whole of the cost of the Proceedings to the Congress. The salary of a wholetime clerk (Rs.60) p.a. was also paid by the Congress to the A.S.B. The A.S.B., on the other hand, made a grant-in-aid of Rs.250 p.a. for the years 1928, 1929 and 1930. After this year contribution was stopped just as the University contributions were also stopped.

The Science Congress has regularly paid Rs.600 p.a. as cost of office expenses and in 1930 paid Rs.1,200 and in 1934, Rs.1,000 for the purpose.

This shows that from the years 1928 onwards the Proceedings of the Congress have been published at the cost of the Science Congress, and any unsold copies belong to them. The same is the case for the unsold copies of the year 1920 (7th Session).

The same position exists for the years 1923–29, though here the A.S.B. has paid half the cost. One might perhaps share the unsold volumes in equal proportions.

The reprint volumes of the first four years, if they should have been published by the A.S.B., belong to them.

Report and recommendation of the Sub-Committee appointed by the Council to look into the question of ownership of the Proceedings and other publications of the Indian Science Congress Association :—

'On the 15th September, 1943, we were appointed a Sub-Committee consisting of the *ex-officio* members (President, Hon. Treasurer, General Secretary), Sir John Lort-Williams, Dr. S. L. Hora and Dr. S. P. Agharkar, to look into the above matter and report to the Council meeting in November. A meeting of this Sub-Committee was called for Tuesday, the 16th November, 1943, at 5 p.m., but only we three could be present.

Our report on the ownership of the Proceedings and other publications of the Congress and recommendations with regard to their disposal are as follows:—

(1) The question of ownership of the publications to be settled in accordance with the recommendations in Dr. Agharkar's note, reading: "The Royal Asiatic Society of Bengal can rightfully claim only the unsold copies of the Proceedings of the first four Congresses and half the copies of the Proceedings of the 5th, 6th, 8th, 9th, 10th, 11th and 12th (1925) Congresses."

(2) The question of disposal to be settled in accordance with the suggestion made in Sir John Lort-Williams' note, reading: "The Society has nursed the Association up to full manhood and has spent considerable sums in so doing. The time has come for a full separation of the two bodies. We are very short of room always and require all our space. Therefore the Association should vacate the space they occupy in our premises and remove all stocks of publications connected with their work and make some reasonable contribution to our funds in respect of those publications belonging to us and those which are joint property."

(3) Upon this basis the amount spent by the R.A.S.B. in respect of joint property is about Rs.7,000 and the amount spent on reprinting the Proceedings of the first five years is about Rs.2,500, making a total approximately of Rs.9,500. But taking into consideration the fact that the R.A.S.B. has nursed the Science Congress for 25 years from its inception and also the fact that the Congress will not be able to realize any large sum by the sale of their publications immediately, it is recommended that the publication be made over to the Indian Science Congress Association on payment of Rs.3,500, as a lump sum.

(4) In view of the above, the R.A.S.B. shall retain the sum (approximately Rs.2,500) they have realized by the sale of publications up to date. They will also retain one more complete set of all the Proceedings and publications.

(5) The two special publications (i) Field Sciences of India and (ii) Progress of Science in India During the Past 25 Years, including reprints, are entirely the property of the Indian Science Congress Association. All unsold copies of these publications shall be made over to the Indian Science Congress Association and Rs.469-5-0 be credited to the Indian Science Congress Association as the price realized by the R.A.S.B. by the sale of copies and reprints.' Sd. Sir John Lort-Williams, Dr. S. P. Agharkar, Dr. Kalidas Nag. Indian Science Congress Sub-Committee. Dated 16-11-43.

Council Order: Adopt. A copy of the report be forwarded to the Secretary of the Indian Science Congress Association requesting at the same time to make arrangements for the payment of the amount and for the removal of the publications as early as convenient. No. 4. 19-11-43.

INSURANCE.—Letter from Commercial Union Assurance Co., Ltd., containing proposals regarding insurance of Society's property. The Company be asked to issue two policies for whole of the premises and property, each for Rs.3,00,000 as specified below, after getting the existing

three policies cancelled, or adjusted so as to obtain the benefit of the premium:—

Schedule I :

	Rs.
On Building	75,000
On books, etc. in the building	25,000
On MSS etc. in the building	2,00,000
	<hr/>
	3,00,000

Schedule II :

Pictures at Darjeeling	50,000
61 cases at Benares	2,25,000
59 pictures at Benares	25,000
	<hr/>
	3,00,000

It was also decided not to have the Society's publications kept at the Aligarh, Nagpur and Allahabad Universities insured. Fin. Com. No. 4(c) of 16-2-43. Accepted by Council. 16-2-43.

LEASE.—Report of infringement of lease condition by the lessees of the Society property Messrs. Lakhiraj Shewakram & Sons, and opinions thereon by the Solicitors, Messrs. B. N. Basu & Co. (a) Thank the Solicitors for their valuable opinion; (b) Instruct the Solicitors to issue a notice to the lessees for the removal of the structure within a month from the date of the notice intimating them at the same time that the lease would be determined by such a breach of covenant as given in their letter. Council No. 3. 19-4-43.

Report on action taken by the Solicitors, Messrs. B. N. Basu & Co., on the lessees, Messrs. Lakhiraj Shewakram & Sons with regard to the unauthorized shed in the Society's premises, and to consider any further action to be taken in view of the shed not having been removed. Record. The Solicitors be consulted whether any summary action can be taken against the lessees; if not, they be asked to proceed in the matter. Council No. 12. 19-5-43.

Letter from Messrs. B. N. Basu & Co., Solicitors, in connection with instituting a case against the lessees, Messrs. Lakhiraj Shewakram & Sons for erecting an unauthorized structure on the plot leased to them. Draft plaint approved, and the Solicitors be asked to file a suit accordingly against the lessees, Messrs. Lakhiraj Shewakram & Sons. The General Secretary is authorized to sign the plaint on behalf of the Council of the Royal Asiatic Society of Bengal. Council No. 3. 21-6-43.

Report payment of Rs.150 to Messrs. B. N. Basu & Co., Solicitors, for meeting initial expenses of filing a suit against the lessees Messrs. Lakhiraj Shewakram & Sons as per their letter, dated 27-5-43. Approved. Fin. Com. No. 3. 21-6-43.

Letter, dated 17-8-43, from the Solicitors, Messrs. B. N. Basu & Co., enquiring if the Society is agreeable to withdraw the suit filed against the lessees, Messrs. Lakhiraj Shewakram & Sons after the removal of the unauthorized structure on the plot leased to them. A representative of the lessees be asked to meet the President to discuss with him regarding the lease. Council No. 11. 24-8-43.

Letter from the Solicitors, Messrs. B. N. Basu & Co., dated 13-11-43, intimating that it is not advisable to proceed with the case against the lessees, Messrs. Lakhiraj Shewakram & Sons as they have demolished the unauthorized structure erected by them. Accept the suggestion of the Solicitors. No further action be taken against the lessees in terms of the Solicitors' letter. Council No. 18. 19-11-43.

Applications from Sewratan Sahu and L. Shaw for granting space of 9'x5' land for erecting a shop on the southern side of the members' retiring room on monthly rents. Reject. Council No. 18. 20-12-43.

LIBRARY.—Report on the completion of slips for the Authors Catalogue of books in the Library from 1934 to date. Sp. Lib. Com. No. 1. 29-3-43.

The question of preparation of a Subjects Catalogue of books in the Library. After discussion of the two items (1 and 2) at length, it was decided to refer the following questions to the Council for specific instruction: (a) Whether the card or sheaf system of catalogue should be adopted for the new accessions. (b) Whether the books already entered in the printed Authors Catalogue, or its supplement, should be also permanently kept in the sheaf or card catalogue as the case may be. (c) Whether the books acquired between 1934 and 1942 should be printed as the Second Supplement to the Authors Catalogue, printed in 1934. Sir John Lort-Williams dissenting.

On the proposal of Sir John Lort-Williams, it was resolved that one binder for sheaf catalogue be purchased and that the present preparation of slips for it be continued till the next Council meeting.

It was also decided to call a meeting of the Library Committee before the next Council meeting. Sp. Lib. Com. No. 2. 29-3-43.

Report on books outstanding with members and what action is to be taken against the defaulters. Apply Rules. Sp. Lib. Com. No. 4. 29-3-43.

Letter from Dr. Roma Chaudhuri, member, requesting loan of the Journals of American Oriental Society which are kept in safe custody at Benares. Express regret. Council No. 14. 19-3-43.

Consideration of a note from the Chairman of the Library Committee with regard to the system of cataloguing to be adopted for the Society's Library and a letter relating thereto from the Library Secretary, Dr. S. L. Hora, dated 11-4-43. Recommend to the Council the adoption of the modified note, as follows:—

(1) (I) As the present printed catalogue of the Library has been declared to be extremely unsatisfactory by several experts a fresh catalogue of all the printed books, periodicals, etc. (other than Sanskrit, Arabic and Persian), be prepared. (II) As at present, the sheaf-catalogue should be continued in accordance with the following principles: There shall be two sets of sheaf-catalogues. In the first the sheaves shall be arranged alphabetically according to the names of authors, with a uniform system adopted for Indian names, anonymous publications, periodicals, etc. In the other the sheaves should be arranged according to the *main* classes and *broad* divisions of Dewey's decimal scheme, using the Sub-Division, Sections, or Sub-Sections *only* when they are required by the special character of the Society's Library. To individualize books within subjects Cutter or Cutter-Sanborn Author numbers are to be used along with the classification number in books. The details of the system should be laid down by the Library Committee, and no departure should be made without their knowledge and consent. (III) All the printed volumes shall be entered in a new Accession Register of the standard form. (IV) After the 'mechanical preparation' of books (i.e. cutting the pages, putting the call-number, writing the price and date of acquisition on a specified page in each, etc.) they shall be arranged on the shelves according to their call-number, with such 'broken order' in the sequence as may be necessary for special reason. Labels should be put on the side of each shelf showing the subjects of books placed in them. (V) Each book should have a pocket at the back of the front cover with a card in it and a date slip pasted on the next page. The cards of books lent should be kept in the office, arranged according to call-numbers, in order to find

out whether any book not found in the Library is missing or lent out. The date-slip, with the dates of issue noted on it, would enable the borrower to return it in time and would also indicate the general use and popularity of any particular book. The present system of vouchers for issuing books should be maintained and these vouchers should be kept arranged according to the date of issue so that undue delay in the return of books may be immediately noted. (VI) There shall be an annual stock-taking of the Library in December. (VII) In order to expedite the preparation of catalogue and bring the new system into operation, the staff of the Library should be placed, for the time being until a Librarian is appointed, in charge of the Chairman of the Library Committee who would lay down programme of work, and prescribe the duties of individual members of the staff in order to give effect to the resolutions of the Council and the Library Committee under the general direction of the General Secretary. (VIII) That coins be added after inscriptions in Library (Regulation 19). (IX) That separate sheaf-catalogues of printed books and manuscripts in the classical languages be prepared, on a method approved by the Library Committee. (X) That in order to co-ordinate the work of the Library Department as a whole the staff of the Manuscript Departments be placed under the Chairman of the Library Committee in the same way as laid down in para VII above. (2) In view of this above recommendation, it was resolved that the recommendation relating to the preparation of the Authors and Subjects Catalogues of the Special Library Committee of 29-3-43 [item 2(a), (b) and (c)] be rescinded. (3) Refer the letter of the Library Secretary, dated 11-4-43, to the Council. Lib. Com. No. 1. 12-4-43.

The question of printing a supplement to the existing Library Catalogue. No Supplementary Catalogue be printed and that the relevant recommendation of the Publication Committee of 12-3-43 and the resolution of the Council of 16-3-43 be rescinded. Lib. Com. No. 2. 12-4-43.

Application from Mr. B. C. Bose, Library Assistant, for permission to attend the training classes of the Bengal Library Association in the Central Library, Calcutta University, during May and June 1943. Allow him to attend after office hours. Lib. Com. No. 7. 19-5-43.

Purchase of Dewey's Decimal Classification from Dr. J. B. Chaudhuri for cataloguing work in the Library. Accept the alternative suggestion of a permanent loan copy of the book kindly offered by Khan Bahadur K. M. Asadullah. Lib. Com. No. 8. 19-5-43.

Report on the progress of cataloguing work in the Library. Approved; an attempt should be made to complete the Subjects Catalogue by the 31st July. Lib. Com. No. 9. 19-5-43.

The question of purchase of Dewey's Decimal Classification and Relative Index (13th edition) for the Library—price Rs.55. Accept the offer of Khan Bahadur M. K. Asadullah giving on loan the abridged edition of 'Dewey' for use in the Library; if this edition be found not satisfactory, the 13th edition offered by Dr. Chaudhuri be purchased; meantime an order for the 14th edition be placed with the publishers in U.S.A. Lib. Com. No. 1. 15-6-43.

Re-organization of the Library staff. Postpone. A special meeting of the Library Committee be called for Monday, the 28th June, to discuss the matter; meanwhile the Library Secretary should circulate a note on the subject to the Library Committee. Recommended to the Council that the provisional appointment of Mr. B. C. Bose as Library Assistant be continued till 31st July, 1943. Lib. Com. No. 3. 15-6-43.

Consideration of the confidential note by the Library Secretary on the re-organization of the Library staff.

The Committee considered the confidential note by the Library Secretary on the re-organization of the Library staff and its recommendations were submitted before the Council held on the 1st of July in

the following memorandum: For the re-organization of the Library staff it is necessary to distinguish between the staff necessary for normal routine work and that required for the following special work decided upon by the Council:

(1) Preparation of both author and subject catalogues for the printed books acquired before 1934. (2) Preparation of catalogue for the Sanskrit MSS. which are not included in the catalogues already printed or in course of publication.

For the normal routine work, the Committee recommend the following staff: (1) A Librarian who will be in charge of the entire department including printed books, MSS., copperplates, coins and other antiquities if any. (2) One Assistant with a knowledge of type-writing. (3) One Pandit with a knowledge of cataloguing Sanskrit MSS. (4) One Maulvi with a knowledge of cataloguing Arabic and Persian MSS.

For the special work referred to above the Committee suggest two alternative schemes: (1) The arrangement with an individual, who is expert in cataloguing, to complete the whole work within a period of twelve months, on a system of contract, on a fixed remuneration calculated as follows:—

For books in European languages, at the rate of 5 books per rupee, totalling Rs.4,000 for 20,000 books, and for Sanskrit MSS., a remuneration of Rs.2,000 for 8,000 MSS. (half of the total number of MSS. that remain to be catalogued). The agreement is to be entered into only if a responsible individual be available. He might do the work with the help of assistants selected by him; it being a condition that the work should be done to the satisfaction of the authorities of the Society. (2) In case the above arrangement be not found possible a cataloguer be appointed for books in European languages either on a salary of Rs.100 a month or upon a piece basis; it being expected that the work should be finished in the course of three years. Similarly a Sanskrit Pandit with a knowledge of preparing catalogues should be appointed on a salary of Rs.60 per month or on a piece basis; it being understood that the work is to be completed within the period of three years.

The Committee recommend that the work should be done under the supervision of the Librarian and further, if necessary, the opinion of an outside expert be obtained, and no payment should be made until the authorities are satisfied that the catalogue has been prepared on the right lines.

As regards permanent staff the Committee make the following recommendations:—(1) That the present Sanskrit Pandit be placed in the grade of Rs.60—5—80. (2) That Mr. N. Gupta be continued in the Library as a typist until such time as his services can be more usefully employed in the General Section. (3) That Mr. S. K. Roy be immediately re-transferred to the General Section and a Librarian be appointed in his place to supervise the work of the whole department. His duties should be: (a) to supervise the Library of printed books; (b) to be in general charge, and supervise the preparation of catalogues of both printed books and MSS., and also to take proper steps for the preservation of manuscripts and safeguarding them against damage and deterioration; (c) to supply information to outsiders regarding printed books and catalogues, and to advise the Council on all matters concerning the proper safe-keeping of books and MSS. and the expansion of these departments; (d) to make proper arrangements about the listing and safe-keeping of the coins, copperplates and other antiquities, art-treasures, and old documents belonging to the Society and to keep a proper Stock Register of the same, and to report on them from time to time, suggesting remedial measures, if any; (e) he would be responsible for the proper arrangement of the books and MSS., files, etc., and supplying information concerning

them whenever required. It will be his primary duty to see that our responsibilities and obligations to the Government and other learned institutions which lent us MSS., coins, etc., be faithfully observed and that the condition on which these were lent by them be properly fulfilled in a satisfactory manner; (f) he should also advise the Council as to the preparation of a consolidated catalogue of all the MSS. and also the feasibility of publishing suitable texts or reprints, of books which are exhausted, and of which reprinting is desirable from an economic or a scholarly point of view; (g) he should also take charge of the proper reviewing of books which are sent to the Society for review in the Society's Journal.

The Committee discussed the question whether this post should be advertised on a salary of about Rs.200, but after hearing the different views expressed on the subject they recommend the appointment of Mr. S. K. Saraswati to this post with effect from 1st August, 1943.

Mr. Saraswati has already been serving in the Society for a period of 6 months. He has thoroughly investigated the present position of the cataloguing of MSS. and the publications of the Society and has derived a fair knowledge of the subject. Further he has already considerable experience in handling and cataloguing MSS. and he possesses high academic attainments and his scholarship for various branches of Indian antiquities is testified to by eminent scholars. He has worked not only with loyalty and enthusiasm but has given evidence of his grasp of the whole work of the Library department which is of a complicated nature. It is mainly due to his ungrudging labour during the last 6 months that the Society has got now a reliable report of the present position in respect of cataloguing of MSS. and publications, and during the last two months he has not only supervised the cataloguing of MSS. and printed books, but has also done preliminary work for making a proper list of the old coins with the help of the Museum authorities. Concerning his scholastic attainments and the practical experience he has gained during these 6 months the Committee feel that it would not be possible to secure the services of an equally competent man on a salary of Rs.200 or even somewhat more. The Committee therefore recommend that he be appointed Librarian for three years on the following terms, subject to termination of the appointment upon three months' notice on either side:

(1) He be given a salary of Rs.150—25—200 per month, (2) that he be permitted to accept a salaried part-time appointment in the Post-Graduate Department of the Calcutta University involving an absence of not more than 3 hours each day on two days a week during the period when the University is in session. He shall not be permitted to take any other remunerative work.

As regards financial implications it will be seen that so far as permanent staff is concerned, Mr. Saraswati really replaces Mr. J. C. De who was a Librarian on Rs.200 till December 1942. Other arrangements remaining the same, the total liabilities of the Society remain as before. It is therefore unnecessary to enter into this question at length. It may be observed, however, that some economy may be effected in the long run by appointing one Maulvi instead of two Maulvies for cataloguing Persian and Arabic MSS., and by substituting for Mr. N. Gupta, an assistant, on a lower grade of pay. Sd. R. C. Majumdar, S. P. Mookerjee, J. Lort-Williams and Kalidas Nag. Khan Bahadur K. M. Asadullah dissented. Special Library Committee Meeting. 28-6-43.

Consideration of the recommendations of the Special Library Committee meeting on Monday, the 28th June, 1943, with regard to the re-organization of the Library staff. Accept recommendations subject to the following changes: that Gupta should be sent back to the office and Bose will continue in the Library for six months longer on present terms. General Secretary to prepare a memorandum on the requirements of the

general office specially after the retransfer of the two assistants (Roy and Gupta). The Finance Committee to consider this memorandum, today's decisions, and any other recommendation, for re-organization of the staff if any (such as from the Publication Committee) and to submit a report to the Council. (Dr. S. L. Hora dissented regarding the Library appointments made as in his opinion the posts should have been advertised.) Special Council. 3-7-43.

Consideration of the appointment of two cataloguers, one in the General Section and the other in the Sanskrit Section, for special work, as recommended by the Library Committee and the Council on 1-7-43, and applications and recommendations received for the purpose. That a Special Committee be formed with the President, the Chairman of the Library Committee, the General Secretary, Sir John Lort-Williams, Khan Bahadur K. M. Asadullah and Dr. N. Dutt to interview and recommend candidates to Council.

That the approved draft for advertisement be circulated to all the members of the Council, requesting them to recommend names of deserving candidates to the General Secretary by the 7th of August next and that the date of interview be fixed for the 16th August.

That the Council be requested to appoint candidates selected by the Committee on the terms recommended by the Special Library Committee meeting, dated 28-6-43.

In case none of the candidates thus interviewed be found suitable, the Council be requested to authorize the Special Committee to recommend deserving candidates after proper advertisements. (Proposed by Sir John Lort-Williams and seconded by Khan Bahadur K. M. Asadullah.) Lib. Com. No. 1. 29-7-43.

Requisites for cataloguing work. That 18 binders and 20,000 slips with dividers be ordered for the cataloguing work after inviting quotations and recommend to the Council to provide funds for them. Lib. Com. No. 3. 29-7-43.

Recommendation of the Library Committee with regard to the purchase of 18 binders, 20,000 slips, etc., for the English Section of the Library was considered and it was decided to recommend the Council to provide money for the purpose. Fin. Com. No. 11. 29-7-43.

Letter from the Secretary, War Prisoners Aid of the Y.M.C.A., Calcutta, enquiring whether facilities can be made to borrow books from the Society's Library for the civilian internees who are detained in internment camps in India. Intimate that the Rules do not permit loan of books to non-members of the Society. Decline. Council No. 13. 19-7-43.

Second Report of Mr. P. C. Bose in continuation of his previous report, dated 29-7-43. Recommend to the Council for the payment of honorarium of Rs.300 to Mr. Bose as decided by the Council on 16-3-43. Lib. Com. No. 4. 15-9-43.

Application dated 7-9-43 from the Society's binders for enhancement of binding charges. Allow an increase of 15% over the existing rate, thus bringing the total increase to 30% above the pre-war rate. Lib. Com. No. 4. 15-9-43.

Recommendations of the Library Committee with regard to the appointments: (a) For the English Section: that Mr. Sibsanakar Mitra, M.A., be appointed provisionally as a cataloguer on a salary of Rs.100 per month, subject to an average monthly output of 600 volumes, and

that he be asked to join immediately. (b) For the Sanskrit Section: That Pandits Jagadish Bhattacharya and Ramdhan Bhattacharya and Mr. N. Subrahmanya Aiyar, M.A., be appointed cataloguers, at present for one month on trial subject to continuance of satisfactory work, on a remuneration calculated at the rate of Rs.25 for every 100 MSS. catalogued by them, and that they be asked to join immediately. Sp. Lib. Com. 16-8-43.

Confirmation of Pandits Jagadish Bhattacharya and Ramdhan Bhattacharya, cataloguers, Sanskrit Section, on present terms and appointment of another cataloguer in the section in place of Mr. N. Subrahmanya Aiyar, M.A., who has not joined. Confirm.

Babu Nanigopal Banerji be appointed on the same terms as the other two Sanskrit cataloguers in place of Mr. N. S. Aiyar not joining. Lib. Com. No. 2. 25-10-43.

The question of closing the Library during the ensuing holidays. Close for Bank holidays only and keep open for 3 hours (2 to 5 p.m.) daily for the remaining holidays. Lib. Com. No. 6. 15-9-43.

Report on books recovered from discarded papers. Include in the Library, General Section, as per list enclosed. Lib. Com. No. 3. 19-11-43.

Question of the appointment of an additional temporary bearer in view of extra work in connection with re-organization work in the Library. Agree: Recommend to Council for necessary arrangements. Lib. Com. No. 4. 17-12-43.

Report about cataloguing in the General and Sanskrit Sections (General Section—1,100 volumes; Sanskrit Section—2,575 MSS. of the Indian Museum Collection). Record. Lib. Com. No. 6. 17-12-43.

Library Secretary's verbal report about the loss of books in the Library (as test cases and pending further enquiry, a short list of a few books in the Catalogue of 1884 but not found in the Catalogue of 1934 and another of a few books in the Catalogue of 1943 but not traceable in the shelves were presented). Record. Arrange for periodical reports. Lib. Com. No. 7. 17-12-43.

Draft scheme for preservation of MSS., books, etc., in the Library. Approve: Recommend to Council for sanction of the scheme. Lib. Com. No. 5. 17-12-43.

The Library Committee recommended the following scheme for the preservation of MSS., books, etc. in the Library of the Royal Asiatic Society of Bengal for sanction by the Council on 17-12-43.

The question of the preservation of MSS., books, etc., in the Library of the Royal Asiatic Society of Bengal was gone into in detail more than three years back and certain measures, as outlined by experts, had been undertaken. An all-round and expensive programme being out of the question, especially after the serious depletion of Society's funds due to cuts in the subsidies from Provincial and Central Governments, the measures adopted by the Society were confined to (i) exposing MSS., books, etc., to the action of volatile disinfectants, such as naphthalene and paradichlorobenzene, and (ii) their repairs and lamination with tissue paper.

Since 1940 the Society has incurred an expenditure of Rs.11,000 approximately in connection with the preservation of MSS., etc.

Capital Expenditure (Non-recurring).

	Rs.	A.	P.	Rs.	A.	P.
Purchase of Steel cabinets				8,000	0	0

Recurring Expenditure.

1940—Salaries of mending staff ..	376	12	9			
Chemicals ..	825	10	0			
				1,202	6	9
1941—Salaries of mending staff ..	321	10	9			
Chemicals, etc. ..	965	13	3			
				1,287	8	0
1942—Salaries of mending staff ..	391	6	0			
Chemicals, etc. ..	158	0	0			
				549	6	0
				11,039	4	9

The mending staff consisted of two pasting duffries and the total of MSS. repaired during the last three years was 688 only, i.e., an average of 229 per year.

Since the visit of Dr. S. N. Sen, Keeper of Imperial Records, in March, 1943, following the enquiries about damaged MSS. from the Department of Education, Health and Lands, Government of India, a change had to be made in the plan of preservation work that was being carried on by the Society. Dr. Sen disapproved of the way in which lamination was being done and it was stopped under his instruction. The Council of the Society entrusted Dr. K. N. Bagchi, Chemical Examiner to the Government of Bengal and a member of the Council of the Society, to draw up a comprehensive scheme for the preservation of MSS., books, etc., in the Library of the Society. Dr. Bagchi analysed the different recommendations of experts and discussed the subject fully with Dr. S. N. Sen when he was in Calcutta in July last. The following scheme is based on the recommendations of Dr. Bagchi as a result of his discussion with Dr. Sen. Due to war conditions and to Society's limited means, the inauguration of an ambitious project being ruled out for the present, these summary recommendations, modest though they may appear at first sight, are expected to tackle effectively the problem of the damage and deterioration of MSS., books, etc. and their repairs till better times prevail.

1. *Air-conditioned room with arrangements for filtration of incoming air and neutralization of corroding agents present in the atmosphere.*

This is a very useful measure, but too expensive for the Society under the present conditions. As air-conditioned rooms prolong the life of paper and inhibit the growth of molds and insects, which ultimately die out, the provision of such a room should, however, occupy the foremost place in the Society's budget for future expansion when times permit.

2. *Fumigation.*

It is both curative and preventive and as such an indispensable necessity. The installation of a proper vacuum chamber for fumigation, which cost Rs.13,000 at the pre-war rate, is ruled out on financial grounds and the Society has arranged for conversion of two steel almirahs into miniature fumigating chambers, the cost being charged to capital expenditure. Provision will have to be made for periodically fumigating all MSS., books, etc. with thymol and paradichlorobenzene vapours. Two such chambers are, however, insufficient for the needs of the Society's Library, but in view of the acute shortage of chemicals which feed such chambers,

it has been thought proper to convert two almirahs for the present, with reservation for more such chambers as chemicals become available.

Arrangements should also be made for sterilizing cabinets and almirahs by thymol and other insecticides regularly at fixed intervals. The use of naphthalene and paradichlorobenzene in cabinets should also be continued. The frequency of sterilizing operations and of the use of disinfectants will depend, however, on the availability of the necessary chemicals.

3. Lamination.

Lamination is the best and the ideal method of strengthening damaged and fragile MSS., etc., and prolonging their life. It may be done with cellulose acetate foils, chiffon or tissue paper with or without an adhesive. Lamination with cellulose acetate foils fixed by heat and pressure in a hydraulic press is the most effective of the laminating methods, in which the recurring cost also comes cheaper. But the cost of such machineries has been estimated to be Rs.26,000 at the pre-war rate and is beyond our means under the present conditions. The use of cellulose acetate foil with an adhesive is also ruled out on account of such foils being not available in the market.

The next alternative is the use of chiffon with an adhesive containing insecticides. Chiffon is now quoted at Rs.10-8-0 per yard and the rate is getting higher day by day. The repairing of all the damaged and fragile MSS. with chiffon, hence, cannot but be considered too expensive and the use of chiffon has to be confined only to MSS. in carbonaceous ink where tissue paper is not recommended. In such cases too, our minimum requirement is expected to come up to at least 500 yards, i.e., a total outlay of Rs.5,500 only for chiffon. As the price is getting dearer every day it may be necessary to stock the above quota and charge the cost to capital expenditure.

Under the above circumstances, lamination has now to be done with the best quality transparent tissue paper as available in the market, except in case of MSS. in carbonaceous ink. The *dextrine* paste, which is recommended, not being available, arrangements are being made to manufacture a special adhesive from formula supplied by the Imperial Records Department.* MSS. and books are to be fumigated before and after they are laminated and are to be kept in disinfected steel almirahs containing sufficient amount of volatile insecticides.

Mending Section.—The mending staff at present consists of two pasting duffries only. An expansion of the staff is imperative, but such expansion must depend nowadays on the availability of the necessary chemicals and materials, which are getting scarcer day by day. Considering the circumstances, a skeleton staff of four members with an experienced head mender may do for the present. The average output of repair work is expected to be more than doubled, as compared to that of the previous years. An experienced mender has to be temporarily requisitioned from the Imperial Records Department and Dr. Sen is agreeable to spare one of his best menders for the purpose. He may be given a salary of Rs.40—2—60 per month. The salaries for other menders should be Rs.20—1—25 per month per head (Society's grade for duffries). The two pasting duffries, who have acquired considerable skill and experience in repair and lamination work during the past years, may be permanently absorbed in this grade. Two other additional hands will have to be appointed, their tenure of service being temporary according to the volume of work in hand.

Dextrine or white flour	..	..	5 lb.
Water	..	..	10 lb.
Saffrol	..	..	12 oz
Oil cloves	..	..	12 oz
White arsenic	..	..	21 oz.

Considering the value of the rare MSS. and books, which the Royal Asiatic Society of Bengal holds in trust, the institution of a properly equipped establishment for the preservation of the old and priceless copies, even with a skeleton staff, is a desideratum that had been long overdue.

A list of binding and mending implements has been obtained from the Imperial Records Department.* Considering the financial position and the rather exorbitant cost of such appliances at present only the minimum of such requirements has been insisted upon, but with due regard to the volume and quality of work. The practice of binding MSS. from outside is to be discarded at once, as it has been found that such MSS. are more susceptible to the havoc of insect pests. The cost of such tools and appliances may be charged to capital expenditure.†

Regarding chemicals and other materials the attention of the Government of India is drawn to the extreme scarcity of such goods. We have not been able to get any quotation for thymol and paradichlorobenzene through normal trade channel and the rates of the black market are exorbitantly high. No fumigation can be undertaken unless we get these two essential chemicals. As these are not controlled items the Chemicals Directorate advised us to get them through normal channel, which, however, has failed. Much of the success of the work depends on these chemicals and unless the Government of India can help us in the matter the Society may have to defer this important work till a future date.

FINANCIAL STATEMENT.

Capital Expenditure—Non-recurring.

Installation of two Thymol chambers and provision of necessary tools and appliances ..	Rs.1,000	
Chiffon, 500 yards, for MSS. and documents in carbonaceous ink, at Rs.10-8 per yard ..	Rs.5,500	
		<u>Rs.6,500</u>

Implements required :

1. Hammer with flat face. 2. Chisel (*Batali*). 3. Saw. 4. *Sekanja* (big and small). 5. Scissors. 6. Knives. 7. Needles.
8. Straight edge. 9. Board cutting scissors. 10. Leather cutter. 11. Slice. 12. Hand press (small). 13. Punch.
14. White marble stone. 15. Brass bowl or enamelled dishes for paste and water. 16. *Sua*.

Materials required :

1. Binding cloth. 2. Art canvas. 3. Leather. 4. Mill board.
5. Straw board. 6. Tape. 7. Linen thread (thick and thin).
8. Marble paper. 9. Glue. 10. Malmal. 11. Chiffon.
12. Tissue paper. 13. Hand-made paper. 14. Ledger paper.
15. Oiled paper. 16. Head-band. 17. Pulp board.

† Additional Suggestions of Dr. S. N. Sen. (Letter No. F.49-43-P, 3-11-43.)

The binding materials being unavailable the old binding should be rejuvenated with a special leather preservative mixture, the application of which on old and brittle leather-bound volumes not only increases the longevity of leather but also serves as an insecticide. The mixture can be prepared according to the following formula:

Lanoline, Anhydrous ..	..	9 oz. (avoir.)
Beeswax ..	..	½ oz. "
Cedarwood oil ..	..	1 oz. (fluid)
Benzene (pure) ..	..	11 oz. "

*Recurring Expenditure.**Annual.*

Establishment—

4 menders, each on a salary of Rs.20—1—25 plus dearness allowance of Rs.10 per month. (Rs.22-8-0 plus Rs.10) $\times 12 \times 4$	Rs.1,560	
1 Head mender on a salary of Rs.40—2—60 plus dearness allowance of Rs.10 per month. (Rs.45 plus Rs.10) $\times 12$	Rs. 660	
		Rs.2,220
*Chemicals, paper and other contingencies		Rs.2,980
		<hr/> Rs.5,200

Council order. Accept. No. 7 of 20-12-43.

LOAN OF MANUSCRIPTS, REQUESTS FOR.—The Principal, Vidybhavana, Visva Bharati, Santiniketan, 4 MSS. of Mahabharata (these are available in the Society. Sanction recommended by the Phil. Secretary). Lend the four MSS. on usual conditions against indemnity bonds executed separately for each of them, viz. Rs.400, Rs.500, Rs.250 and Rs.250 respectively. Council, No. 3(a). 29-7-1943.

The Registrar (Mr. R. G. Harshe, Member, R.A.S.B.) Deccan College Post-Graduate and Research Institute, Poona, for 'Mirat-i-Sikandari' (this MS. was in a dilapidated condition, but it has been properly repaired). Lend the MS. against indemnity bond to the value of Rs.500 after Prof. Haq has finished with it. Council. No. 3(b). 29-7-43.

Dr. N. Dutt for two MSS. of 'Samadhiraja' (these have been sent to Benares, but Dr. Dutt likes to have this matter placed before the Council). Postpone consideration. Council. No. 3(c). 29-7-43.

Application from Vishveshvaranand Vedic Research Institute, Lahore, for the loan of the Nagari MS. 'Kannasatapath Brahmana'. Lend against indemnity bond to the value of Rs.500 for a period of three months according to rule. Council. No. 3. 19-5-43.

The Bhandarkar Oriental Research Institute, Poona, for two MSS. of Bhartrhari-Satakatraya (Govt. coll. Nos. 7747 and 7779). Grant on two indemnity bonds of Rs.50 each. Liby. Com. No. 2(a). 19-11-43.

Prof. Chintaharan Chakravarti for a MS. of Saugatatsutrabhasya (Govt. coll. No. 8300). Grant on an indemnity bond of Rs.100. Liby. Com. No.3(b). 19-11-43.

Mr. M. S. Alimuddin for two MSS. of Sharhu'l-Kashshaf (Arabic coll. Nos. 60 and 61). Grant in respect of MS. No. 60 (Arabic coll.) on indemnity bond of Rs.600 only. Liby. Com. No. 2(c). 19-11-43.

MANUSCRIPTS.—Report on the cataloguing of manuscripts in the Sanskrit Section of the R.A.S.B. Recommend to the Council the introduction of a sheaf-catalogue on the lines suggested by Mr. S. K. Saraswati in the report. Lib. Com. No. 3. 12-3-43.

The method to be introduced for the preservation of MSS. in the Library. Circulate the relevant papers concerning this to the members of the Library Committee in the first instance. Sp. Lib. Com. No. 3. 29-3-43.

The method to be adopted for the preservation of manuscripts (postponed for consideration by the Special Library Committee). Refer to Dr. Bagchi for report. Lib. Com. No. 5. 12-4-43.

* These include paste, paper, chemicals, disinfectants, binding and mending materials, etc,

Draft of a letter to be sent to the Government of India in reply to their enquiry about the reported damage to the MSS. that are on loan from them. Approved and issue. Council No. 4. 19-4-43.

Letter from the Jt. Secretary to the Government of India, Department of Education, Health and Lands, Simla, dated 13-4-43, enquiring whether any damage was done to the manuscripts loaned to the Society by the Government. Reply in the same terms as in item No. 4. Council No. 5. 19-4-43.

The question of preparing microfilms of rare and valuable MSS. of the Society. The Library Secretary be requested to make an appraisal of precious MSS. and prepare a list of the most important of them in order of priority so that the microfilming work may begin when the film will be available. Lib. Com. No. 2. 19-5-43.

The question of periodical inspection of books and MSS. of the Society at Benares. In view of Dr. B. S. Guha's statement to the effect that the Manuscripts kept in the boxes are safe and will not be damaged so long as they are kept sealed as they are at present, recommended that the boxes at Benares be not opened. Lib. Com. No. 3. 19-5-43.

Proposal for appointing a temporary Pandit for the preparation of slips of undescribed MSS. for a co-ordinated summary catalogue of all the collections. The present Pandit in charge of the manuscripts be asked to prepare the list along with his other duties; meantime engage a suitable man for the preparation of slips for a sheaf catalogue on piece basis, his remuneration to be decided upon after report from the Library Secretary has been received. Lib. Com. No. 5. 19-5-43.

The question of converting one or two steel almirahs into air-tight fumigation chambers (estimates from Messrs. Eastern Camera Repairing Works amounting to Rs.50-4-0 or Rs.78-4-0 per almirah). Accept tender for Rs.50-4-0 from Messrs. Eastern Camera Repairing Works and arrange for conversion of two almirahs at the above rate, and recommend to the Council for payment of the expenditure incurred in this connection after the work has been completed. Lib. Com. No. 4. 15-9-43.

Letter from Dr. K. N. Bagchi, dated 21-6-43, forwarding a note prepared by him for the preservation of books and manuscripts. Thank Dr. Bagchi for the note; circulate the note to the Library Committee and the Council. Council No. 13. 21-6-43.

Letter from Dr. D. M. Sen, Jt. Secretary, Department of Education, Health and Lands, Government of India, dated the 5th June, 1943, concerning preservation of manuscripts. Draw up a scheme and bring up for consideration by the next meeting. Council No. 14. 21-6-43. [For the Scheme *vide* pp. 21-25.]

Letter from the Gaudiya Mission, Baghbazar, dated the 13th July requesting permission to be granted to three members of the mission to collate, compare and take copies of 16 MSS. for printing certain unpublished works of the Vaishnava saints by them (most of the MSS. are in the Society). Grant on condition that the mission joins the Society as an Institutional member; in the event of publication of any works by them, they be asked to make suitable acknowledgment in them, and to present a copy each to the Society's Library. Council No. 4. 29-7-43.

MEDALS.—Letter from Dr. B. C. Law offering to make over to the Society 3½% G.P. Notes to the face value of Rs.8,000 for the institution of a Gold Medal to be named after him, and further letter from Dr. B. C. Law, dated 9-11-43, to the President with regard to the proposed 'Bimala Churn Law Gold Medal'. (a) Accept the offer of Dr. Law with the thanks of the Society's Council, intimating to him that the Council agree that the donor during his lifetime shall be a member of the Board. (b) A board

consisting of the President, the Philological Secretary (Dr. Dutt), Historical and Archaeological Secretary (Dr. Majumdar), and the donor be constituted for making the award at the next Annual meeting. Council No. 6. 19-11-43.

Report payment by Dr. B. C. Law G.P. Notes to the face value of Rs.8,000 for the institution of the gold medal, Rs.280 for the cost of the first medal to be awarded in 1944 and Rs.185 for making the die. Record with thanks to the donor. Council No. 14. 20-12-43.

Recommendation of Dr. Bimala Churn Law Gold Medal Advisory Board. Accept the recommendation that the medal for 1943 be awarded to Dr. Suniti Kumar Chatterji. Council No. 3. 20-12-43.

Appointment of Advisory Boards for the awards of (a) Barclay Memorial Medal (Medicine or Biology). The Board to consist of the *ex-officio* members (Biological and Medical Secretaries), General Secretary, Sir U. N. Brahmachari, Dr. S. L. Hora, Dr. S. C. Law and Dr. K. N. Bagchi. (b) Sir William Jones Memorial Medal (Philosophy, Literature and History). The Board to consist of the *ex-officio* members (Philological and Jt. Philological Secretaries), General Secretary, Mr. C. W. Gurner, Dr. R. C. Majumdar, Dr. S. K. Chatterji, Prof. M. M. Haq and Dr. S. N. Das-Gupta. Council No. 2. 15-9-43.

Recommendation of the Sir William Jones Memorial Medal Advisory Board. Accept the recommendation that the medal for the year 1943 be awarded to Sir Sarvapalli Radhakrishnan. Council No. 2. 20-12-43.

Recommendation of the Barclay Memorial Medal Advisory Board. Accept the recommendation that the medal for 1943 be awarded to Sir Upendranath Brahmachari. Council No. 4. 20-12-43.

Letter from Mr. R. C. Roy, dated 15-10-43, offering to give to the Society on behalf of his mother, Mrs. Sarat Chandra Roy, a sum of Rs.4,000 for the institution of a gold medal to be named after his father; also a gold medal in commemoration of the 160th Anniversary. Accept the offers with the thanks of the Society's Council. (2) A Board consisting of the President, General Secretary, and Dr. Griffiths be constituted for framing suitable regulations for the award of the medal. Council No. 11. 25-10-43.

Report of receipt of payment of Rs.4,000 Mrs. Sarat Ch. Roy through Mr. Ramesh Chandra Roy for the institution of Sarat Chandra Roy Memorial Medal, and Rs.250 for making the first medal to be awarded in 1944. Record with thanks to the donor. Council No. 15. 20-12-43.

Appointment of Advisory Boards for the awards of: (a) Sarat Chandra Roy Memorial Medal (Cultural Anthropology). The Board to consist of the Anthropological Secretary (*ex-officio*), a nominee from among the heirs of the late S. C. Roy, Prof. K. P. Chattopadhyaya, Mr. L. R. Fawcous and the General Secretary. Council No. 6(a). 20-12-43.

Draft of 'Regulations regarding the award of the Sarat Chandra Roy Memorial Medal,' prepared by the Sub-Committee appointed for drafting the Regulations. Adopt, and report for information of the next Ordinary Monthly Meeting as prescribed in Rule 48(a). Council No. 5. 20-12-43.

Appointment of Advisory Board for the award of Pramatha Nath Bose Memorial Medal (Geology). The Board to consist of Mr. W. D. West, Dr. P. K. Ghosh, Prof. N. N. Chatterji, Dr. S. P. Agharkar, Dr. K. N. Bagchi, Dr. M. M. Chatterji and the General Secretary. Council No. 6(b). 20-12-43.

MISCELLANEOUS.—Report by the General Secretary of the services rendered by Prof. J. N. Banerjee (Member) for identifying coins

coming to the Society and by Dr. N. Ray, University Librarian, for giving advise for the re-organization of the Library and to Dr. Habibullah and Dr. Imam for helping in cataloguing the Persian and Arabic MSS. section, as well as to Dr. P. C. Bagehi and Prof. L. Sukul for the advice as regards the utilization and classification of the Sino-Tibetan and the Hindi sections respectively. Thank them on behalf of the Society. Council No. 4. 16-2-43.

Letter, dated 24-2-43, from the Varendra Research Society, Rajshahi, requesting a rebate of half the price of certain parts of the back numbers of the Society's Journal which they wish to purchase. Allow the usual rebate of 33½% on the sale price of the Journals asked for. Council No. 1. 16-3-43.

Appeal from V. S. Sukthankar Memorial Edition Committee, Poona, for donation in connection with the proposed publication of 'Sukthankar Memorial Volume'. Intimate that the Society would purchase a volume when published. Council No. 2. 19-4-43.

Letter from Mr. T. N. Ramachandran, dated 29-7-43, regarding archaeological remains at Mainamati and Lalmai, near Comilla. Include it as an item in the programme of the Monthly Meeting on 2nd August, 1943. Council No. 18. 29-7-43.

Letter from Dr. S. N. Sen, Keeper of Imperial Records for inclusion of the name of the Imperial Record Department in the free distribution list for subsequent Journals and publications of the Society. Grant. A discount of 40% be allowed in respect of old publications asked for. Lib. Com. No. 2. 15-9-43.

General Secretary's Report on the collection of the late Mr. Johan van Manen and the Society's claims thereon. Submit the claims of the Society to Mr. Van Aken, the Dutch Consul, in charge of collection. Bib. Ind. Com. No. 6. 6-9-43.

Report by the General Secretary based on the General Assistant's note (S. K. Roy) on old book-order files up to 1940. The General Secretary was authorized to dispose of them as waste paper after taking out usable papers. Council No. 14. 25-10-43.

Reprint of an article by Sir Lewis Fermor, Kt., that appeared in an American Magazine 'Discovery' in August, 1943, and forwarded by him to the Society. Thank Sir Lewis for the reprint. An endeavour should be made to procure copies of the reprint from the Manager of the Imperial Chemical Industries in Calcutta. Council No. 16. 19-11-43.

NUMISMATICS.—Suggestion for appointment of a temporary Assistant for preparing a classified list of coins in the Society's collection and for making arrangement for keeping them in cabinets. Mr. T. N. Ramachandran be requested to prepare a classified list of all the coins in the Society's possessions. Lib. Com. No. 4. 19-5-43.

PATRONAGE.—Draft of a letter to be addressed to His Excellency the Viceroy, requesting him to accept the patronage of the Society. Approved. Council No. 13. 25-10-43.

Letter, dated the 17th November, from the Military Secretary to H.E. the Viceroy intimating that His Excellency is very pleased to accept the Patronage of the Society. Record. The thanks of the Society be conveyed to His Excellency. Enquire whether it would be convenient for His Excellency to preside over the Special 160th Anniversary meeting in January, 1944. Council No. 1. 19-11-43.

Report of death of Sir John Herbert, a former Governor of Bengal and a Patron of the Society. Announce at the next Monthly Meeting

and send a letter of condolence to the Lady Mary Herbert. Council No. 13. 20-12-43.

PUBLICATIONS.—Report by the General Secretary on the progress of the work of Csoma de Kőrös for the forthcoming 'Memoirs of the Society'. Dr. S. K. Chatterji, Dr. N. Dutt and Dr. P. C. Bagchi be requested to prepare the final press copy in consultation with the editor, Prof. D. C. Chatterji. Pub. Com. No. 6. 12-3-43.

Paper by B. C. Kundu on 'Anatomy of Jute Stem'. The Committee regrets it is unable to recommend the publication in the Society's Journal on account of the prohibitive cost of reproducing the photographs. Pub. Com. No. 2. 17-12-43.

Recommendations of the Publication Committee of 17-12-43. Council Order : Accept with amendments on items 2 and 3 on the minutes as follows:—Item No. 2. Paper by B. C. Kundu on 'Anatomy of Jute Stem'. The General Secretary should discuss with the author whether he would be prepared to meet the cost of reproducing the plates, and any decision arrived at with him be communicated to the next meeting of the Council. Item No. 3. Paper by C. C. Das-Gupta on 'Supplement to Bibliography of Ancient Indian Terracotta Figurines'. The Publication Committee is fully empowered to accept or reject a paper in accordance with No. 4 of the 'Regulations regarding the submission of communications for publication', in terms of which the paper is referred back to the Committee for passing final order on it.

In this connection, the President placed before the meeting a letter, dated 2-12-43, from Dr. Baini Prashad and the correspondence that passed between Dr. Prashad and the Society about his paper on 'Raja Birbal'. The President undertook to reply to Dr. Prashad direct. No. 8. 20-12-43. [For re-organization of Publication Department, see under Bibliotheca Indica.]

RE-ORGANIZATION OF LIBRARY AND OFFICE STAFF.—

Note by the General Secretary concerning dearness allowance to staff. Report of the Library Sub-Committee. Report on staff of the Society (adjourned for consideration by the Council meeting of 5-10-42).

Council Order. A Sub-Committee consisting of the *ex-officio* members (President, General Secretary and Honorary Treasurer), Sir John Lort-Williams, Dr. S. P. Mookerjee, Dr. M. N. Saha and Dr. R. C. Majumdar be constituted to enquire into and report within two weeks upon the working of the system of administration of the Society which was recommended by the late Enquiry Committee, and suggest what (if any) alterations or amendments are necessary, and upon the recommendations of the Library Committee and the General Secretary regarding the Library system and the staff generally. Council. Nos. 12, 13 and 14. 23-11-42.

Preliminary Report of the Sub-Committee, dated 29th November, 1942.

Recently we were appointed a Committee to enquire into and report, within two weeks, upon the working of the system of administration of the Society which was recommended by the late Enquiry Committee and suggest what (if any) alterations or amendments are necessary, and upon the recommendations of the Library Committee and the General Secretary regarding the Library system and the staff generally. The first point to be noted is that the scheme recommended by the Enquiry Committee has never yet been put fully into operation.

The main recommendation, and the essential foundation of all else was that two Assistant Secretaries be appointed, one to be in charge of the Cultural and the other of the Business activities of the Society.

Owing to the heavy cost of other reforms recommended, such as the substitution of steel for wooden shelving and almirahs, the wiping out of the serious arrears in publication, and the improvements in general office administration, it was not found possible to provide salaries for two Assistant Secretaries.

As a compromise the Council decided to appoint one Assistant Secretary, upon the comparatively low salary of Rs.200—50—500, to superintend both the Cultural and the Business activities of the Society, under the supervision of the General Secretary, who was expected to be able to devote to this task at least one or two hours daily.

Serious and extensive efforts upon two occasions were made to discover a suitable candidate, without success, and we are satisfied that it is not possible to procure such a candidate unless a very much higher salary be offered and one sufficient to attract a really first class man with both cultural attributes and administrative experience.

On the first occasion Mr. Seal was appointed. He turned out to be an excellent Business Secretary, but did not claim to be qualified culturally. When he left the Society's employment to fill a very much better paid post, Mr. De was selected, out of over a hundred applicants, and appointed on probation, but he failed to display the requisite business qualifications and was subsequently placed in charge of the Library, though he had had no previous training in the duties of a Librarian.

The result of all this has been that the cultural activities of the Society have been almost entirely neglected, and there has been a steady decline in the efficiency of the staff and general administration and the condition of the Library is such that it has been condemned by a Sub-Committee in almost derisory terms.

We have no doubt that there will be no permanent improvement until the Society is in a position to put in practice the scheme recommended by the Enquiry Committee and appoint two properly qualified and efficient Assistant Secretaries and a trained Librarian, upon adequate salaries.

In default of that possibility it will be necessary to attract a scholar of standing and repute, with sound administrative experience, some knowledge of business, and able to exercise authority and control, by reverting to the practice and offering the status of a whole-time General Secretary, with a suitable salary or honorarium.

In our opinion it is essential that there should be upon the premises of the Society during all working hours some person or persons qualified to receive and attend to visitors, superintend all the activities of the Society, control the staff, and see that their work is carried out regularly, efficiently and with steady continuity of practice.

But the present state of slackness and confusion, inadequacy and inefficiency necessitates prompt action and adequate control, and we consider that for the next 12 months, at least, someone should be appointed as General Secretary who will be able to devote at least three hours daily to the work of restoring order out of chaos and exercising general supervision.

We have persuaded Dr. Kalidas Nag to accept this onerous task, and upon those conditions, if the Council think fit to appoint him and the Society to elect him, and we recommend his appointment and election and that he be paid a conveyance allowance of Rs.150 per month to enable him to devote the necessary time to the work of the Society in addition to his other engagements. Dr. Hora has expressed his willingness to resign his office of General Secretary as his public work prevents him from devoting more than a few hours weekly to the work of the Society.

We recommend also that Mr. De's probationary period be extended for one month from the 1st January, 1943, that the consideration of the

questions regarding the staff and Library be postponed until Dr. Nag had an opportunity to look into them and assist us with his advice and experience, that Dr. Hora be added to the Committee and that we be allowed two months within which to make our final report. Sd. Sir John Lort-Williams, S. P. Mookerjee, R. C. Majumdar and S. L. Hora.

Note by Dr. M. N. Saha.—I was not present during the later stages of deliberation of the Committee as I had to go to Delhi. I cannot say that I am in full agreement with all that is said in the report. I intend, however, to raise no objection to the proposals made, which may be given a trial. I wish, however, to add that the proposals scarcely go to the root of the troubles.

To my mind, the ideal solution should be to appoint a whole time Assistant Secretary, and assign to him duties similar to those given to the Assistant Secretary of the Royal Society. I would request the members of the Council to look through the pages of the Year Book of the R.S. where these duties are very fully described.

There would be two obstacles to the adoption of such a proposal (1) The financial question; (2) amendment of the rules. I do not consider (1) is insuperable; (2) requires careful consideration. I think that the rules of R.A.S.B. are not quite satisfactory but require revision. Cannot the Council do this work?

Letter of resignation from Mr. J. C. De, dated 31-12-43. Accept. The General Secretary reported that it had been necessary also to provide for the Library work without delay and he had engaged provisionally Messrs. B. C. Bose and S. K. Saraswati—the former upon a salary of Rs.75 per month as a full-time assistant and the latter for part-time work of three hours daily at a remuneration of Rs.100 per month to be debited to one of the special funds. Confirm action taken and refer to Special Sub-Committee to include recommendations upon this matter in their report. Council No. 3. 14-1-43.

Final Report of the Sub-Committee, dated 30-1-43.—During the last two months we have had a full opportunity of enquiring into the working of the system of administration recommended by the Special Enquiry Committee and the other matters referred to us and we have had the advantage of Dr. Nag's co-operation and advice. We are satisfied that the state of slackness and confusion, inadequacy and inefficiency to which we referred in our preliminary report was not due to any fundamental defects in the system recommended and adopted for the Library, the staff and the administration generally, but to factors, some temporary and some of longer standing, which have impeded seriously the successful working of the system. These factors are:—

(1) Disorganization, confusion, and partial suspension of work as a result of A.R.P. measures taken to safeguard our possessions.

(2) Lack of regular and adequate supervision and continuity of policy owing to upset caused by transfers of personnel among Government servants.

(3) General slackness, indiscipline, lack of co-ordination and inattention to work of the staff, partly due to war scares.

(4) Inefficiency, unsuitability, and lack of necessary cultural equipment of certain members of the staff, particularly in the Library.

(1) These (A.R.P.) measures have now been completed. Partly due to inconsistent orders, of the 32,000 odd volumes of books, etc., ten months were spent by the old staff of the Library in removing some 20,000 to the ground floor, whereas the balance of 12,000 has been removed, under Dr. Nag's direction, in the single month of January 1943.

(2) This condition has been remedied by the appointment of Dr. Nag as General Secretary, upon the terms recommended in our preliminary report.

(3) General slackness and indiscipline, etc. of many members of the staff, both clerical and menial, had gradually reached very serious proportions. Henceforth a register should be kept by the Superintendent of the time kept by every member of the staff and the Rules about late attendance, etc., strictly enforced by the General Secretary. The authority of the Superintendent should be strengthened—all complaints, etc., should be made to him and brought by him to the notice of the General Secretary. Any approach by any member of the staff to individual members of the Council should be considered a ground for dismissal.

(3) and (4) Our task has been simplified to some extent by (a) the resignation of Mr. De. (b) The resignation of Mr. Das. (c) The dismissal of the temporary Filing Clerk whose services were no longer necessary. (d) The headlong flight without notice of all but four of the menial staff after the air-raid on 24-12-43. These were the men upon whom we had sought to rely for A.R.P. measures. Their work and discipline had been unsatisfactory for some considerable time and they were dismissed summarily. A smaller number of menials, including cycle peons, on slightly higher pay, have been appointed in their place.

Book Library.

A modified version of the 'Dewey' system of cataloguing, etc., was adopted upon the recommendation of the Special Enquiry Committee, after very careful consideration of experienced advice. We are of opinion that it is fully adequate and eminently suitable for the peculiar needs of our Library. The necessary special registers and equipment were purchased, at a cost of Rs.711, so far back as August 1941. We find that during the seventeen intervening months very little work has been done on the Authors Catalogues, less on the Subjects Catalogue and some of the Registers have not even been touched. For many months nothing has been done at all. In such a lamentable state of affairs and in face of such gross slackness, confusion, ignorance and lack of necessary experience of those responsible, we are not surprised at the report of the Library Sub-Committee. But the defects are not in the system adopted, but in the omission to work it.

We estimate that with a proper staff and ordinary application the Authors Catalogue from 1934 to date can be completed within three months.

Dr. Nag has transferred to the Library Ray, who in the past has had considerable experience of work in our Library, and intends to transfer Gupta also, who is able to type. In addition, we recommend that Mr. B. C. Bose, M.A., who has been appointed provisionally, be appointed permanently as Library Assistant upon the grade of Rs.75—5—125. We recommend also that Gupta, who has been about 19 years in our service upon the lower grade of Rs.50—3—80, plus a personal allowance of Rs.10 recommended by the Special Enquiry Committee, be raised to the grade of Rs.75—5—125 with a commencing salary of Rs.100.

MSS. Library.

The neglect of our priceless collection of MSS. for many years past amounts almost to a disgrace. Since the death of Dr. H. P. Sastri their cataloguing has been talked about for a long time, but very little has been done and, in our opinion, much money has been wasted. We find that two part-time Editors alone succeeded in absorbing Rs.25,000. We undertook, over six years ago, to prepare, within 2 years, a catalogue of 11,000 MSS. from the Indian Museum, entrusted to us by Government

and the work has not yet been touched. We consider that these heavy tasks should be undertaken forthwith and actively and unceasingly pursued by culturally qualified students tackling particular collection and being remunerated, upon a specified project basis, out of the Oriental Publication Funds until the whole work has been completed. We cannot afford to get all this necessary work done quickly without some voluntary help and we recommend that efforts be made to enlist promising young scholars who are interested in this kind of work, and, in addition, that Mr. S. K. Saraswati, M.A., who has been appointed as Library Assistant provisionally upon a part-time basis of 3 hours daily at a salary of Rs.100 per month be retained upon the same terms for the time being. The question of his permanent employment may be considered after six months' experience has been gained. His salary should be debited to the Oriental Publications Fund No. 1.

Audit and Valuation, Press, Publications, Stock.

The insurance of our possessions is in a most unsatisfactory and muddled condition, mainly owing to the fact that we have only the vaguest idea about their value. A proper valuation, so far as possible, should be commenced immediately and a new Policy taken out to cover accurately specified properties and complete inventories should be made of all our assets. A thorough overhaul of *stock* is necessary and accurate statements prepared showing which of our publications have been completed. The *Press* and *Publications* side of our activities has been neglected and has suffered on account of slackness, lack of interest, unsuitability and lack of necessary equipment of the staff employed. We require constant information and advice about the business part of our undertaking and guidance about which publications are most in demand, so as to avoid blocking too much capital in slow-selling publications. For all these purposes we recommend the provisional appointment of Mr. D. Burman, M.Com., on a part-time basis of 3 hours daily and a salary of Rs.100 per month to date from the 1st of February, 1943. His permanent appointment may be considered later.

It will be observed that our recommendations are mainly tentative and experimental and their success will depend upon constant supervision, trial, consultation and report. In conclusion therefore we recommend that this Sub-Committee be re-appointed, to assist the General Secretary, make interim reports if necessary, and, after six months' trial, review the situation generally, report to the Council on the results of the measures taken, and advise about the future. (Sd. C. S. Fox, Sir John Lort-Williams, C. W. Gurner and Kalidas Nag.) (Drs. Saha, Majumdar and Hora dissented.)

Consideration of Final Report of the Sub-Committee appointed by the Council on 2-11-42. Council Order: Accept the majority report. Mr. Bose to remain provisionally appointed. Mr. Gupta granted provisionally a salary of Rs.100 irrespective of grade with effect from 1st February, 1943. Mr. D. Burman, M.Com., to be appointed for five months on Rs.100 per month from 1st February, 1943. Mr. Pramil Bose, Assistant Librarian, Calcutta University, is appointed to assist in the organization of the Library on an honorarium of Rs.300. The Sub-Committee not to be re-appointed. No. 10. 16-2-43.

REPRESENTATION.—Letter from the National Institute of Sciences of India requesting to nominate two representatives of the Society to serve on its Council as an additional Vice-President and an additional member of Council for 1943. Mr. W. D. West and Dr. D. M. Bose be re-nominated as an additional Vice-President, and an additional member of Council respectively to represent the Society on the Council of the National Institute of Sciences of India. Council No. 1. 14-1-43.

Letter from the Calcutta University requesting to nominate a representative to serve on the Special Committee for the appointment of the Kamala Lecturer for 1943. Dr. R. C. Majumdar be the Council nominee. Council No. 1. 19-5-43.

Letter from the Registrar, Calcutta University, requesting the Society to nominate a representative to serve on the Selection Committee for the award of the Sarojini Basu Medal. Dr. B. C. Law be the Society's nominee. Council No. 1. 21-6-43.

Letter, dated 3-9-43, from the Honorary Secretary, National Institute of Sciences of India, requesting the Society to send representatives of the Society to participate in the Symposium on the 27th and 28th September. Dr. R. C. Majumdar and Dr. M. Ishaque be the Society's representatives. Council No. 1. 15-9-43.

Representation of the Society at the 12th Session of the All-India Oriental Conference which will be held at Benares in December 1943. Dr. Majumdar be requested to represent the Society. Council No. 1. 25-10-43.

Representation of the Society at the 6th Session of the Indian History Congress which will be held at the Muslim University, Aligarh, in December 1943. Dr. Majumdar be requested to represent the Society. Council No. 2. 25-10-43.

Circular letter from the National Institute of Sciences of India, dated 3-11-43, requesting: (a) The Society's views on the resolutions adopted at the meeting of the Symposium with regard to the formation of a National Research Council in India. Intimate that the Society approve generally of the resolutions of the Symposium. (b) To nominate representatives of the Society to attend the meeting of the Symposium which will be held in Delhi in December 1943. Dr. S. P. Agharkar, Dr. M. N. Saha and Dr. R. C. Majumdar be requested to represent the Society. Council No. 3. 19-11-43.

REQUESTS.—Letter from the Hony. Secretary, 'Common Wealth' requesting the use of the Society's Hall, once a month, for public meetings to be held under the auspices of 'Common Wealth'. Decline. Council No. 2. 29-7-43.

Letter from the Hony. Secretary, National Institute of Sciences of India, requesting the use of the Society's hall for holding Symposium on the 27th and 28th August. Grant on usual charge of Rs.10 per day. Council No. 15. 29-7-43.

Letter, dated 11-9-43, from the Honorary Secretary, National Institute of Sciences of India, requesting the use of the hall of the Society for the Symposium on 27th and 28th September, free of charge. No charge to be made for the meetings of the National Institute of Sciences of India as a special case in view of their paying regular room rent to the Society. Council No. 12. 15-9-43.

Dr. S. N. Sen's letter requesting free gifts of certain books published in the Bibliotheca Indica Series. Allow a discount of 40% on the books asked and supply Journals free as requested. Bib. Ind. Com. No. 8. 6-9-43.

Letter from the Business Manager, Bengal Entertainment Services, Calcutta, dated 20-10-43, requesting to be allowed to display a notice board at the south-west corner of the Society concerning the 'BESA' Theatre. Permitted free of any charge subject to rights of lessees; the applicant be written to reduce the size of the board. Council No. 12. 25-10-43.

Request for the use of the Society's hall for the 38th Annual General Meeting of the Mining, Geological and Metallurgical Institute of India on Friday, the 21st January, 1944. Grant on usual charge of Rs.10. Council No. 2. 19-11-43.

Request from Sir Cyril S. Fox, Kt., to be allowed temporarily the use of a room on the ground floor for his office on a monthly rent of Rs.60. Grant, subject to one month's notice on either side. Council No. 7. 19-11-43.

STAFF.—Application from D. K. Das, Press Clerk, for a loan of Rs.500 from the Provident Fund, alternatively tendering his resignation. Loan cannot be granted as it is against Provident Fund Regulations. Accept resignation. Fin. Com. No. 4. 14-1-43.

Report payment of the Provident Fund dues to Mr. D. K. Das (resigned) according to Provident Fund Rules. Record. Fin. Com. No. 3. 16-2-43.

The question of the payment of the full benefit of the Provident Fund money standing in the name of Mr. D. K. Das. Pay full amount. Fin. Com. No. 4(a). 16-2-43.

Application from D. K. Das, dated 24-1-43, withdrawing his letter of resignation, dated 9-1-43. Express regret. Council No. 8. 16-2-43.

Application from the Superintendent, dated 16-2-43. Grant a personal allowance of Rs.20 with effect from 1-1-43. Fin. Com. No. 5. 16-2-43.

Date from when Pandit G. N. Bhattacharya will be put in his new grade of Rs.60—5—80 as recommended by the Special Library Committee of 28-6-43. 1st of January, 1944. Fin. Com. No. 6. 29-7-43.

Order as to the Fund out of which Mr. S. K. Saraswati is to be paid his salary when he will be put in charge of the Library. Pay from the General Fund with effect from 1st August, 1943. Fin. Com. No. 5. 29-7-43.

The case of the Office Duftry, Sh. Chunna. His services be dispensed with with effect from the date of suspension; pay to him the aggregate amount only subscribed by him to the Provident Fund, without interest, in accordance with the conditions of No. 14 of the Regulations regarding the Provident Fund; the Darwan, who detected the theft, be given a reward of Rs.5. The General Secretary was also authorized to provide fittings, locks, etc., to the Society's doors and windows as are found to be necessary for safeguarding the Society and its possessions against burglary, clandestine sale and theft. It was also resolved that in future such cases of theft as are detected should be placed in the hands of the Police. Council No. 2. 24-8-43.

Application, dated 17-12-43, from A. Michael (Stenographer) for change of grade. Grant a personal allowance of Rs.5 for special work with his annual increment due to him with effect from 1-1-44. Fin. Com. No. 3(h). 20-12-43.

List of
Patrons,
Officers, Council Members, Members,
Fellows, and Medallists
of the
Royal Asiatic Society of Bengal,
on the 31st December, 1943

PATRONS OF THE ROYAL ASIATIC SOCIETY OF BENGAL

1943 H.E. Field Marshal Viscount Wavell,
P.C., G.C.B., G.M.S.I., G.M.I.E.,
C.M.G., M.C., Viceroy and
Governor-General of India.

1910-1916 .. Lord Hardinge of Penshurst, K.G.,
P.C., G.C.B., G.C.M.G., G.C.S.I.,
G.C.I.E., G.C.V.O., I.S.O.

1917-1922 The Most Hon'ble the Marquess of
Zetland, P.C., G.C.S.I., G.C.I.E.

1922-1927 .. The Right Hon'ble the Earl of Lytton,
P.C., G.C.S.I., G.C.I.E.

1926-1931 .. The Right Hon'ble the Viscount Halifax,
K.G., P.C., G.C.S.I., G.C.I.E.

1927-1932 .. Colonel Sir Francis Stanley Jackson,
P.C., G.C.I.E.

1931-1936 .. The Right Hon'ble the Earl of Willingdon,
G.M.S.I., G.C.M.G., G.M.I.E., G.B.E.

1932-1938 .. The Right Hon'ble Sir John Anderson,
P.C., G.C.B., G.C.I.E.

1936-1943 .. The Most Hon'ble the Marquess of
Linlithgow, K.T., P.C., G.M.S.I.,
G.M.I.E., G.C.I.E., D.L., O.B.E., T.D.

1938-1943 .. Sir John Arthur Herbert, G.C.I.E.

OFFICERS AND MEMBERS OF COUNCIL OF THE ROYAL ASIATIC SOCIETY OF BENGAL DURING THE YEAR 1943

Elections Annual Meeting, 1943

President

Dr. Syamaprasad Mookerjee, M.A., B.L., D.Litt., LL.D., Barrister-at-Law.

Vice-Presidents

Sir Cyril S. Fox, D.Sc., M.I.Min.E., F.G.S., F.N.I., F.R.A.S.B.

Sir John Lort-Williams, Kt., K.C.

Dr. Meghnad Saha, D.Sc., F.R.S., F.N.I., F.R.A.S.B.

Dr. S. C. Law, M.A., B.L., Ph.D., F.Z.S., M.B.O.U., F.N.I.

Secretaries and Treasurer

General Secretary :—Dr. Kalidas Nag, M.A., D.Litt.

Treasurer :—C. W. Gurner, Esq., C.S.I., I.C.S.

Philological Secretary :—Dr. Nalinaksha Dutt, M.A., Ph.D., D.Litt.

Joint Philological Secretary :—Dr. M. Z. Siddiqi, M.A., Ph.D.

Natural History Secretaries { Biology :—Dr. S. P. Agharkar, M.A., Ph.D., F.N.I.
Physical Science :—Dr. K. N. Bagchi, D.Sc., M.B.,
F.I.C., D.T.M., F.N.I.

Anthropological Secretary :—Dr. W. G. Griffiths, M.A., B.D., B.Sc., Ph.D.

Historical and Archaeological Secretary :—Dr. R. C. Majumdar, M.A., Ph.D., F.R.A.S.B.

Medical Secretary :—Dr. J. B. Grant, M.D., M.P.H., F.A.P.H.A.

Library Secretary :—Dr. Sunder Lal Hora, D.Sc., F.Z.S., F.R.S.E., F.N.I., F.R.A.S.B.

Other Members of Council

The Hon'ble Mr. Justice N. G. A. Edgley, M.A., I.C.S., J.P., Barrister-at-Law.

L. R. Fawcett, Esq., C.I.E., I.C.S.

Percy Brown, Esq., M.B.E., A.R.C.A., F.R.A.S.B.

Dr. B. C. Law, M.A., B.L., Ph.D., D.Litt., F.R.G.S., F.R.A.S.B.

Dr. M. Ishaque, M.A., B.Sc., Ph.D.

APPOINTMENTS, ABSENCE AND OTHER CHANGES DURING THE YEAR

Mr. Percy Brown, absent from 1st April to 1st November.

Mr. C. W. Gurner, absent from 19th April to 28th May.

The Hon'ble Mr. Justice Edgley, Offg. Treasurer from 19th April to 28th May; absent from 5th September to 1st November.

Dr. R. C. Majumdar, Library Secretary from 3rd May.

Dr. S. L. Hora, Member of Council from 3rd May; absent from 1st July to 15th August.

Dr. W. G. Griffiths, absent from 6th May to 21st June.

Dr. S. P. Agharkar, absent from 10th May to 1st July; 15th to 31st December.

Sir John Lort-Williams, absent from 25th August to 1st November.

Sir Cyril S. Fox, absent from 1st September to 1st November.

Dr. M. Z. Siddiqi, absent from 15th September to 1st November.

ORDINARY MEMBERS

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R=Resident. N=Non-Resident. F=Foreign. A=Absent. L=Life.

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An Asterisk is prefixed to names of Ordinary Fellows of the Society.

Date of Election		
5-4-22	R	* Abdul Ali , ABUL FAIZ MUHAMMAD, M.A., M.R.A.S., F.R.S.L., F.R.G.S., F.R.H.S., F.R.A.S.B. 3 Nawab Abdur Rahman Street, Calcutta.
4-1-43	R	Abdul Hai , HAFIZ MUHAMMED, M.A., <i>Professor in Arabic and Persian, Presidency College.</i> 42-A Boniapukur Road, 2nd Floor, Block D, Calcutta.
2-11-25	N	Acharya , PARAMANANDA. B.SC., <i>State Archæologist, Mayurbhanj State, P.O. Baripada.</i>
2-3-21	R	Agharkar , SHANKAR PURUSHOTTAM, M.A., PH.D., F.L.S., F.N.I., <i>Sir Rash Behari Ghose Professor of Botany, Calcutta University.</i> 35 Ballygunge Circular Road, Calcutta.
3-2-36	N	Ahmad , ALFAZUDDIN. KHAN BAHADUR, <i>Offg. Assistant Director of Public Instruction for Muhammedan Education, Bengal (retd.).</i> Dhalhora, Tamluk, Midnapur.
2-8-43	N	Ahuja , Y. D., M.A., M.O.L., <i>Head of the Department of Persian and Urdu, Doaba College.</i> Jullundur City, Punjab.
6-6-17	N	Aiyangar , K. V. RANGASWAMI. RAO BAHADUR, M.A., <i>Director of Public Instruction, Travancore (retd.).</i> Vasumati Vilas, Rangachari Road, Mylapore, Madras.
6-12-26	N	* Aiyangar , S. KRISHNASWAMI, DEWAN BAHADUR, M.A., PH.D., M.R.A.S., F.R.HIST.S., F.R.A.S.B., RAJASEVASAKTA, <i>Professor, University of Madras.</i> 'Sripadam', 143 Brodies Road, Mylapore, Madras, S.
1-12-20	N	Akbar Khan , MAJOR NAWAB SIR MOHAMMED, K.B.E., C.I.E., LT.-COL., I.A., <i>Khan of Hoti.</i> Hoti, N.-W.F.P.
2-11-42	R	Akbar , M. (NEDVI), M.A., <i>Lecturer, Calcutta University,</i> 22 Nilmadhab Sen Lane, Calcutta.
3-5-43	R	Aken , C. E. VAN, <i>Consul for the Netherlands in Calcutta.</i> 27 Dalhousie Square, Calcutta.
5-6-39	R	Ali , S. SHAMSER, <i>Insurance Underwriter.</i> 3 Bright Street, Ballygunge, Calcutta.
1-6-42	R	Alimuddin , M. S., <i>Mutwalli to the Wakf Estate, Khan Sahib M. S. Azizuddin, Landlord.</i> Post Box No. 6777, Calcutta.
4-4-38	A	Anderson , J. 15 Park Street, Calcutta.
3-7-12	F	Andrews , EGBERT ARTHUR, B.A. c/o The Royal Empire Society, Northumberland Avenue, London, W.C.
6-5-40	R	Asadullah , KHALIFA MOHAMMAD, KHAN BAHADUR, <i>General Central Service Class I; Librarian, Imperial Library.</i> 34 Chittaranjan Avenue, Calcutta.
3-3-30	L	Ashton , HUBERT SHORROCK, <i>Merchant.</i> Trueloves, Ingatestone, Essex, England.
2-11-42	N	Aucott , MRS. ANNE, <i>Teacher, Rathlin Hall School,</i> Darjeeling.

Date of Election.		
3-9-34	R	Auden , JOHN BICKNELL, M.A. (CANTAB.), F.G.S., F.N.I., <i>Assistant Superintendent, Geological Survey of India.</i> 27 Chowringhee, Calcutta.
3-11-30	R	Austin , GEORGE JOHN, <i>Sanitary Engineer, Messrs. J. B. Norton & Sons, Ltd.</i> Stephen House, 5 Dalhousie Square, Calcutta.
1-5-39	A	Ayrton , SHAVUX MUNCHERSHAW, <i>Assistant, Messrs. Shaw Wallace & Co.</i> Madon Mansions, 275-C Bow Bazar Street, Calcutta.
3-3-14	L	*Bacot , J., F.R.A.S.B. Boulevard Saint-Antoine, 61 Versailles Seine-et-Oise, France.
7-9-36	R	Bagchi , K. N., RAI BAHADUR, B.SC., M.B. (CAL.), F.I.C. (LOND.), D.T.M. (CAL. & L'POOL), <i>Chemical Examiner to the Government of Bengal.</i> Medical College, Calcutta.
1-11-26	R	Bagchi , PROBODH CHANDRA, M.A., DR.-ES-LETTRES (PARIS), <i>Member of the A.S. of Paris; Lecturer, Calcutta University.</i> 94 Ballygunge Place, Ballygunge, Calcutta.
1-3-26	R	Bagnall , JOHN FREDERICK, B.SC., A.M.I.MECH.E., A.M.I.E.E., A.M.INST.C.E., CAPT., I.E. <i>Office of the Chief Engineer of Factories, 34 Park Street, Calcutta.</i>
2-4-24	N	*Bahl , K. N., D.SC., D.PHIL., F.N.I., F.R.A.S.B., <i>Professor of Zoology, Lucknow University.</i> Badshahbagh, Lucknow.
3-8-42	R	Bake , ARNOLD ADRIAAN, M.A. (OXON), D.LITT. 6 Temple Chambers, 6 Old Post Office Street, Calcutta.
7-4-41	R	Baker , ERNEST BRAIN HINDLEY, O.B.E., I.C.S., <i>Jt. Secretary to the Home Department, Government of Bengal.</i> 5 Wellesley Place, Calcutta.
5-4-43	R	Banerjee , BINAYAKANATH, M.A., B.L., <i>Advocate, Calcutta High Court.</i> 6/1 Williams Lane, Calcutta.
1-8-38	R	Banerjee , J. N., M.A., PH.D., <i>Lecturer, Calcutta University.</i> 28 Manoharpukur Road, Calcutta.
7-12-36	R	Banerjee , S., I.C.S. 14 Dover Park, Ballygunge, Calcutta.
1-9-41	N	Banerji , SURES CHANDRA, M.A., <i>Zemindar.</i> 45 Lakshmi Bazar, Dacca.
3-12-23	R	Barwell , N. F., M.A., M.C., LT.-COL. (retd.), <i>Barrister-at-Law.</i> Temple Chambers, 6 Old Post Office Street, Calcutta (and) Aylmerton House, Aylmerton, Norfolk, England.
2-10-39	N	Bastin , REGINALD WALTER, I.C.S. <i>Magistrate's House,</i> Noakhali.
7-12-36	R	Basu , INDUBHUSAN, M.D. (CAL.), <i>Medical Practitioner; Associate Professor of Medicine and Visiting Physician, Carmichael Medical College.</i> 19 Vivekananda Road, Calcutta.
6-2-39	R	Basu , JNANENDRA NATH, VIDYALANKAR, <i>Member, Benares Hindu University Court; Fellow, Theosophical Society; Landholder; Director, Messrs. Thacker Spink & Co.</i> 9 Park Lane, Calcutta.
3-12-24	R	Basu , JATINDRA NATH, M.A., M.L.C., <i>Solicitor.</i> 14 Baloram Ghose Street, Calcutta.
5-2-40	N	Basu , MRIGANKA MAULI, I.C.S., <i>District Magistrate.</i> Bogra.
1-3-26	R	Basu , NARENDRA KUMAR, M.L.C., <i>Advocate, High Court.</i> 12 Ashu Biswas Road, Bhawanipore, Calcutta.
2-10-39	N	Basu-Mazoomder , WOOSHACUR, B.L., M.R.A.S., F.R.S.A. (LOND.), <i>Bengal Civil Service (Judicial); Munsif.</i> Jangipur, Murshidabad.

Date of Election.		
7-7-09	N	Bazaz , RANGNATH KHEMRAJ, <i>Proprietor, Shri Venkateshwar Press</i> . 7th Khetwadi, Bombay No. 4.
4-3-40	N	Bell , FRANK OWEN, B.A. (CANTAB.), I.C.S., <i>District Magistrate</i> , Dacca.
7-5-34	R	Bent , WILLIAM ANTONY, <i>Assistant, Messrs. George Henderson & Co., Ltd.</i> 101/1 Clive Street, Calcutta.
4-3-25	N	Benthall , THE HON'BLE SIR EDWARD C., KT., <i>Member, Viceroy's Council</i> . 3 Queen Victoria Road, New Delhi.
7-4-09	L	*Bentley , CHARLES A., C.I.E., M.B., D.P.H., D.T.M. & H., F.R.A.S.B., <i>Professor of Hygiene</i> . University of Egypt, Cairo.
8-1-36	N	Berkeley-Hill , OWEN, A.R., M.A., M.D., B.CH. (OXON), M.R.C.S. (ENGLAND), D.T.M. (LOND.), LT.-COL., I.M.S. (retd.). Station View, Ranchi.
4-6-28	N	Bhadra , SATYENDRA NATH, RAI BAHADUR, M.A., <i>Formerly Principal, Jagannath Intermediate College</i> . 5 Nayabazar, Dacca.
1-8-17	R	*Bhandarkar , DEVADATTA RAMKRISHNA, M.A., PH.D., F.R.A.S.B. 2/1 Lovelock Street, Ballygunge, Calcutta.
2-11-42	R	Bhagat , PHOOLCHAND, <i>Mill-owner and Merchant</i> . Bhagat Villa, Grand Trunk Road, Konnagar, Dt. Hooghly.
6-5-40	N	Bharucha , FARROKH E., <i>Merchant</i> . Canada Building, Hornby Road, Bombay.
5-8-43	R	Bhattacharya , JOGESH CHANDRA, M.A., <i>Lecturer in English, City College</i> . 79 Sambhunath Pandit Street, P.O. Elgin Road, Calcutta.
7-7-24	L	Bhattacharyya , BINOYTOSH, M.A., PH.D., RAJARATNA, <i>General Editor, Gaekwad's Oriental Series, and Librarian, Oriental Collections, Baroda State</i> . Baroda.
1-2-43	N	Bhattacharjee , MRS. SERAPIA. 3/B Davis Road, Lahore.
4-6-28	N	Bhattachali , NALINI KANTA, M.A., PH.D., <i>Curator, Dacca Museum</i> . Ramna, Dacca.
5-3-28	R	Biswas , THE HON'BLE MR. JUSTICE CHARU CHANDRA, C.I.E., M.A., B.L., <i>Judge, High Court</i> . 58 Puddopukur Road, P.O. Elgin Road, Calcutta.
1-8-23	L	Biswas , KALIPADA, M.A., D.SC. (EDIN.), F.R.S.E., <i>Superintendent, Royal Botanic Garden</i> . Sibpur, Howrah.
3-1-27	N	Bivar , HUGH GODFREY STUART, I.C.S., <i>District and Sessions Judge</i> . Faridpur.
6-12-43	R	Bonnerjee , MISS SADHONA, <i>Research Scholar</i> . 66 Lansdowne Road, Calcutta.
4-11-35	N	Bor , N. L., M.A., D.SC., F.L.S., I.F.S. Burma Refugee Organization, Shillong, Assam.
2-8-43	N	Bose , JOGESH CHANDRA. 'Vasudham', P.O. Contai, Dt. Midnapur.
6-7-25	R	Bose , MANMATHA MOHAN, M.A., <i>Professor Emeritus, Scottish Church College</i> . 19 Gokul Mitra Lane, Hatkhola, Calcutta.
7-12-36	N	Bose , AMBUJ NATH, M.B.E., M.D. (LAUSANNE), F.R.C.P. (EDIN. & LOND.), LT.-COL., I.M.S. C.I.M.H., Abbottabad, N.-W.F.P.
4-12-39	R	Bose , DEBENDRA MOHAN, M.A., PH.D., F.N.I., <i>Director, Bose Research Institute</i> . 93 Upper Circular Road, Calcutta.
7-8-39	R	Bose , GIRINDRASHEKHAR, M.B., D.SC., F.N.I., <i>Professor of Psychology and Head of the Department of Psychology, Calcutta University</i> . 14 Parsi Bagan Lane, P.O. Amherst Street, Calcutta.

Date of Election.		
2-3-31	N	Bose, SUDHANSU KUMAR, B.SC. (CAL.), A.R.S.M., B.SC. (MINING) (LONDON), Professor of Mining and Surveying. Indian School of Mines, Dhanbad.
2-1-39	R	Bose, SUDHANSU MOHAN, M.A., LL.B. (CANTAB.), Barrister-at-Law. 3 Federation Street, P.O. Amherst Street, Calcutta.
2-11-36	N	Bothra, SUBHKARAN SINGH, Banker. Kundigar Bhairon, Jaipur City.
4-5-31	R	Bottomley, JOHN MELLOR, C.I.E., B.A. (OXON), I.E.S. (retd.), Formerly Director of Public Instruction, Bengal. 5 Mayfair Road, Ballygunge, Calcutta.
5-12-32	A	Boyle, CECIL ALEXANDER, MAJOR, D.S.O., Adviser in Languages and Secretary to the Board of Examiners. Army Headquarters, Simla.
3-12-34	R	Brahmachari, PHANINDRA NATH, M.SC., M.B. 19 Loudon Street, Calcutta.
1-1-08	L	*Brahmachari, SIR UPENDRA NATH, KT., RAI BAHADUR, M.A., PH.D., M.D., F.S.M.F., F.N.I., F.R.A.S.B. 19 Loudon Street, Calcutta.
7-11-27	N	Brahmachary, SARAT CHANDRA, RAI BAHADUR, M.A., B.T. Kasba Road, Ballygunge, P.O. Dhakuria, 24-Pergs.
6-1-36	A	Brocke, A. G., D.SC. (DOCTOR PHILOSOPHIE NATURALIS) (JENA), Branch Manager, Pharmaceutical Department, 'Bayer'. 52/4/1 Ballygunge Circular Road, Calcutta.
3-7-07	L	*Brown, JOHN COGGIN, O.B.E., D.SC., F.G.S., M.I.M.E., M.INST.M.M., M.I.E., F.R.A.S.B. c/o Messrs. Grindlay & Co., 54 Parliament Street, Westminster, London, S.W.1.
6-10-09	R	*Brown, PERCY, M.B.E., A.R.C.A., F.R.A.S.B., Secretary and Curator, Victoria Memorial. Calcutta.
4-3-40	A	Bruce, ALEXANDER EDWIN ROBERT, B.A., A.C.P., M.R.S.T., F.R.G.S., A.R.I.P.H.H., M.R.A.S., CAPT. 12 Russell Street, Calcutta.
8-1-96	F	*Burn, SIR RICHARD, KT., C.S.I., M.A., F.R.A.S.B. 9 Staverton Road, Oxford, England.
4-12-39	R	Cameron, REV. ALLAN, M.A., B.D., Principal, Scottish Church College. 3 & 4 Cornwallis Street, Calcutta.
4-7-38	A	Carstairs, ANDREW McLAREN, M.A., Bengal Chamber of Commerce. Royal Exchange Buildings, 2 Clive Street, Calcutta.
3-2-36	F	Catto OF CAIRNCATTO, THE RIGHT HON'BLE LORD, BART. 'Woodlands', Clamp Hill, Stanmore, Middlesex, England.
1-9-20	R	Chakladar, HARAN CHANDRA, M.A. 28/4/2 Srimohan Lane, Kalighat, Calcutta.
7-3-32	R	Chuckerbutty, KHIRODE BEHARI, Engineer and Manufacturer. 7 Hindusthan Park, P.O. Ballygunge, Calcutta.
4-7-27	L	Chakravarti, CHINTAHARAN, M.A., KĀVYATĪRTHA, Professor of Bengali. Krishnagar College, Krishnagar.
3-2-30	N	Chakravarti, M. N., M.SC., Divisional Transportation Officer, N.W.R. Karachi.
3-1-27	N	Chakravarti, NIRANJANPRASAD, M.A., PH.D. (CANTAB.), Deputy Director-General, Archaeological Survey of India. Simla.
6-2-39	N	Chakravarti, RASH MOHAN, PH.B., PURANBHATNA, VIDYAVINODE, Superintendent, Rammala Chhatravas. P.O. Brahmanbaria, Dt. Tipperah.

Date of Election.		
3-1-06	L	Chapman, JOHN ALEXANDER. 32 Lavington Road, West Ealing, London, W.3.
7-2-27	N	Chatterjee, ASHOKE, B.A. (CAL.). B.A. (CANTAB.). <i>Labour Welfare Officer.</i> Burnpur, via Asansol.
1-7-40	R	Chatterjee, A. B., M.A., <i>General Manager, Metropolitan Printing & Publishing House Ltd.</i> 4-B Council House Street, Calcutta.
27-10-15	F	Chatterjee, SIR ATUL CHANDRA, K.C.I.E., K.C.S.I., <i>Late High Commissioner for India.</i> Withdean, Cavendish Road, Weybridge, Surrey, England.
2-3-36	R	Chatterjee, MANOMOHAN, B.SC. (CAL.), PH.D. (LOND.), A.R.C.S., D.I.C., <i>Professor of Geology, Presidency College.</i> 170/2 Lower Circular Road, Calcutta.
1-10-20	R	Chatterjee, NIRMAL CHANDRA, Barrister-at-Law. 5 Theatre Road, Calcutta.
3-5-43	R	Chatterjee, PARESH CHANDRA. 6 Mission Row, Calcutta.
4-7-27	R	Chatterjee, PATITPABON, M.A., B.L., <i>Vakil, High Court.</i> 84 Harrison Road, Calcutta.
2-9-40	R	Chatterji, BANKIM CHANDRA, M.SC., <i>Department of Pure Mathematics, Calcutta University.</i> 31-B W. C. Bonnerjee Street, Calcutta.
4-6-34	N	Chatterji, BIJAN RAJ, PH.D. (LONDON), D.LITT. (PUNJAB), <i>Professor of History, Meerut College.</i> Meerut.
5-1-31	N	Chatterji, DURGACHARAN, M.A., <i>Lecturer in Sanskrit.</i> Krishnagar College, Krishnagar.
7-6-11	N	Chatterji, KARUNA KUMAR, M.B.E., LT.-COL., I.T.F., M.C., v.H.A.S. Sailasram, Kanke Road, Ranchi.
7-5-28	R	Chatterji, KEDAR NATH, B.SC. (LONDON), A.E.C.S. (LONDON). c/o Probasi Office, 120/2 Upper Circular Road, Calcutta.
6-8-24	R	*Chatterji, SUNITI KUMAR, M.A. (CAL.), D.LITT. (LONDON), F.R.A.S.B., <i>Kumar Guruprasad Singh Professor of Indian Linguistics and Phonetics, Calcutta University.</i> 'Sudharma', 16 Hindusthan Park (off Rashbehari Avenue East End), Ballygunge, Calcutta.
2-3-36	R	Chatterji, MRS. TUHINIKA, M.A., KAVYATIRTHA, <i>Research Scholar, Examiner, Calcutta University.</i> 5 Wood Street, Calcutta.
5-11-24	R	Chattopadhyay, K. P., M.SC., <i>Professor and Head of the Department of Anthropology, Calcutta University.</i> 2 Palm Place, Ballygunge, Calcutta.
2-11-25	N	Chattopadhyaya, KSHETRESA CHANDRA, M.A., <i>Lecturer in Sanskrit.</i> Allahabad University, Allahabad.
4-4-38	R	Chaudhuri, MRS. ROMA, M.A., D.PHIL. (OXON), <i>Professor of Logic, Lady Brabourne College.</i> 3 Federation Street, Calcutta.
4-11-35	R	Chaudhuri, S. N. 52 Ballygunge Circular Road, Calcutta.
3-5-43	R	Chokhany, RAM DEV, RAI BAHADUR. 27 Baranashi Ghosh Street, Calcutta.
5-12-23	L	Chopra, B. N., D.SC., F.N.I., F.L.S., <i>Assistant Superintendent, Zoological Survey of India.</i> Kaiser Castle, Benares Cantonment.
1-2-22	R	*Chopra, SIR R. N., KT., C.I.E., M.A., SC.D., M.D. (CANTAB.), F.R.C.P., F.N.I., F.R.A.S.B., BREVET-COL., I.M.S., <i>Drug Research Laboratory, Jammu and Kashmir State.</i> Srinagar, Kashmir.

Date of Election.		
2-4-28	R	Chowdhury , RAI JATINDRANATH, <i>Zemindar</i> . 36 Russa Road, Tollygunge, Calcutta.
3-7-07	L	*Christie , WILLIAM ALEXANDER KYNOCH, B.SC., PH.D., M.INST.M.M., F.R.A.S.B. Secretariat, Principal Supply Officers' Committee (India), Defence Department, Simla.
2-2-31	R	Clough , JOHN, <i>Barrister-at-Law</i> . 17 Store Road, Ballygunge, Calcutta.
5-5-30	F	Cooper , G. A. P. 29 Eccleston Street, Eaton Square, London, S.W.1.
6-3-39	R	Culshaw , REV. WESLEY JAMES, <i>Methodist Minister</i> . 16 Sudder Street, Calcutta.
5-12-39	N	Das-Gupta , C. C., M.A., <i>Professor</i> , Carmichael College, Rangpur.
6-8-24	L	Davies , L. M., LT.-COL., M.A., F.R.S.E., F.R.A.I., F.G.S. 8 Garscube Terrace, Murrayfield, Edinburgh, 12, Scotland.
4-3-29	R	De , J. C., M.B., M.R.C.P., M.R.C.S., LT.-COL., I.M.S. 11 Rowland Road, Calcutta.
3-6-40	N	De , JATIS CHANDRA, M.A., B.L. (CAL.), M.A. (LOND.), <i>Lecturer in History</i> , Hindu University. Benares.
5-12-27	L	Dechhen , H.H. MAHARANI KUNZANG, <i>Maharani of Sikkim</i> . Gangtok, Sikkim.
5-5-30	N	Deo , SIR PRATAP CHANDRA BHANJ, K.C.I.E., <i>Maharajah</i> , <i>Ruler of Mayurbhanj State</i> . P.O. Baripada, Mayurbhanj, B.N.R.
4-5-10	L	Dhavlé , SHANKAR BALAJI, B.A., I.C.S. (retd.), <i>Formerly Judge</i> , Patna High Court. The Bai Jerbai Wadia Library, Fergusson College, P.O. Deccan Gymkhana, Poona.
2-11-42	L	Dhiman , MEHAR CHAND, <i>Merchant</i> . Tulsi Niwas, 115 Benares Road, Salkia, Howrah.
4-8-20	N	*Dikshit , KASHINATH NARAYAN, RAO BAHADUR, M.A., F.R.A.S.B., <i>formerly Director-General of Archaeology</i> . New Delhi.
5-1-98	R	Dods , WILLIAM KANE, <i>Agent</i> , Hongkong and Shanghai Banking Corporation. 6 Minto Park, Alipur, Calcutta.
2-7-02	L	Doxey , FREDERICK. 'Ballygunge', Cooden Drive, Bexhill-on-Sea, Sussex, England.
7-11-32	R	Driver , DARAB CURSETJI, M.A. (CANTAB.), <i>Barrister-at-Law</i> ; <i>Constituted Attorney to Messrs. Tata & Sons, Ltd</i> ; <i>Managing Agents for The Tata Iron & Steel Co., Ltd</i> . 87/C Park Street, Calcutta.
6-6-38	N	Dudhoria , NABA KUMAR SING, <i>Zemindar and Banker</i> . Azimganj, Dt. Murshidabad.
6-9-37	A	Durniz-Podewils , COUNT, <i>Consul-General for Germany</i> . 34 Park Street, Calcutta.
2-1-33	N	Dutch , ROBERT AUSTEN, O.B.E., B.A. (CANTAB.), I.C.S., <i>Magistrate and Collector</i> . Noakhali, Tipperah.
30-9-35	R	Dutt , MOHENDRA NATH, L.E., I.S.E. (retd.), <i>Consulting Engineer</i> . 12 Kailas Bose Lane, Howrah.
5-12-32	R	Dutt , NALINAKSHA, M.A., B.L., PH.D., D.LITT. (LOND.), <i>Lecturer</i> , Calcutta University. 39 Badur Bagan Row, P.O. Amherst Street, Calcutta.
1-7-40	R	Dutt , SUDHIR CHUNDER, CAPT., M.B., A.I.R.O., <i>Ophthalmic Surgeon</i> , Mayo Hospital. 214/2 Lower Circular Road, Calcutta.

Date of Election.		
2-12-40	R	Edgley, THE HON'BLE MR. JUSTICE NORMAN GEORGE ARMSTRONG, M.A. (OXON), Barrister-at-Law, I.C.S., Judge, Calcutta High Court. 9/1 Middleton Street, Calcutta.
1-11-38	A	Eekhout, JHR. P. J., Vice-Consul for the Netherlands. Clarke's Hotel, Simla.
5-1-31	L	Evans, PERCY, B.A. (CANTAB.), F.G.S., Geologist. c/o The Burma Oil Co., Digboi, Assam.
1-12-41	N	Ewart, DOUGLAS J., Missionary of Presbyterian Church of Scotland. Westminster Hostel, Rajshahi, Bengal.
6-2-28	L	Ezra, SIR DAVID, KT., F.Z.S., M.B.O.U. 3 Kyd Street, Calcutta.
2-5-38	R	Faroqui, NAWAB SIR K. G. M., KT., of Ratanpur. 10 Rowland Road, Ballygunge, Calcutta.
2-12-29	R	Fawcus, LOUIS REGINALD, C.I.E., B.A. (CANTAB.), I.C.S., Member, Board of Revenue, Bengal. United Service Club, Calcutta.
3-8-04	L	*Fermor, SIR LEWIS LEIGH, KT., O.B.E., M.INST.M.M., D.SC., A.R.S.M., F.G.S., F.R.S., F.N.I., F.R.A.S.B., Formerly Director, Geological Survey of India. 24 Durdham Park, Bristol 6, England.
4-1-26	F	Fleming, ANDREW. Rand Club, Johannesburg.
4-3-40	R	Foster, ALBERT RIDGELEY, B.SC., A.I.C., Agricultural Chemist and Agricultural Expert. c/o Imperial Chemical Industries (India) Ltd., 18 Strand Road, Calcutta.
5-11-13	L	*Fox, SIR CYRIL S., KT., D.SC. (BIRM.), M.I.M.E., F.G.S., F.N.I., F.R.A.S.B. Formerly Director, Geological Survey of India. 5 Loudon Court, Moira Street, Calcutta.
5-11-28	R	Galstaun, JOHN CARAPIET, O.B.E., Merchant and Landholder. 234/4 Lower Circular Road, Calcutta.
1-11-26	R	Galstaun, SHANAZAN G., M.A., D.M.R.E., F.F.R., M.R.C.S., L.R.C.P., Radiologist, Medical College Hospital. 34 Chowringhee Road, Calcutta.
6-10-09	R	*Gangoly, ORDHENDRA COOMAR, B.A., F.R.A.S.B. 84-B Shambhunath Pundit Street, Elgin Road, Calcutta.
5-11-34	A	Gee, EDWARD ROWLAND, M.A. (CANTAB.), F.N.I., F.G.S., Assistant Superintendent, Geological Survey of India. 27 Chowringhee, Calcutta.
2-1-33	N	George, JAMES, B.A. (CANTAB.), I.C.S., Deputy Commissioner. Darjeeling.
5-2-40	N	Ghatak, INDU BHUSHAN, B.A. (CAL.), C.T.E. (DAC.), MED. (AMB.), DIP.LBR. (B.L.A.), Examiner, Patna University; Lecturer, St. John Ambulance Association; Ex-member, Subordinate Educational Service, C.P.; Associate, Red Cross Society; Headmaster, Paligunj H.E. School, Paligunj. Patna.
6-2-33	L	Ghatak, JYOTISH CHANDRA, M.A. (TRIPLE), SAHITYA SARASWATI, JYOTISH-SAGARA, Professor, Calcutta University. 4 Boloram Bose Ghat Road, Bhawanipore, Calcutta.
5-8-43	R	Ghose, DEBES CHANDRA, Merchant and Tea Estate Agent. P.O. Box No. 632; 'Mission Court', P.12 Mission Row Extension, Calcutta.
1-11-43	R	Ghose, GOBINDA PROSAD, M.A., B.L., Landholder. 43 Rashbehari Avenue, Calcutta.
1-6-42	R	Ghose, RABINDRA CHANDRA, Barrister-at-Law. 10 Debendra Ghose Road, Bhawanipore, Calcutta.

Date of Election.		
3-12-24	R	Ghose, SUSHIL CHANDRA, B.A., Deputy Magistrate. 1 Sikdarbagan Street, Calcutta.
4-9-39	N	*Ghosh, SIR J. C., KT., D.SC., F.N.I., F.R.A.S.B., Director, Indian Institute of Science. Hebbal, Bangalore.
2-4-24	R	Ghosh, K., D.T.M., D.P.H. (CANTAB.), L.M.S., Medical Practitioner. 45 Creek Row, Calcutta.
7-3-27	R	Ghosh, PHANINDRA NATH, M.A., PH.D., SC.D. (PADUA), F.INST.P., Sir Rashbehary Ghosh Professor of Applied Physics, University of Calcutta. 92 Upper Circular Road, Calcutta.
1-6-42	R	Ghosh, PRAKRITY KUMAR, M.SC., PH.D., D.SC., D.I.C., F.N.I., Geologist, Geological Survey of India. 27 Chowringhee, Calcutta.
2-9-40	R	Ghosh, PRASHANTA KUMAR, M.B., D.T.M., M.R.C.P. (LONDON), Visiting Physician, Carmichael Medical College Hospital. P.7/1 Chittaranjan Avenue Extension, P.O. Beadon Street, Calcutta.
7-5-28	R	*Ghoshal, UPENDRA NATH, M.A., PH.D., F.R.A.S.B., Formerly Professor of History, Presidency College. 35 Badur Bagan Row, Calcutta.
1-2-26	R	Ghuznavi, SIR ABDUL HALIM, KT., M.L.A., Zemindar. 18 Canal Street, Entally, Calcutta.
6-8-28	R	Ghuznavi, ISKANDER S. K., Zemindar. 21 Syed Ameer Ali Avenue, Circus P.O., Calcutta (and) Dilduar, Mymensingh.
7-12-36	R	Gillespie, ANDREW DOLLAR, Chemist and Senior Partner, Messrs. Bathgate & Co. 17 Old Court House Street, Calcutta.
5-8-43	R	Gomes, POLYCARP JOSEPH, Secretary, European Group, Calcutta Corporation. 2/A Haralal Das Street, Calcutta.
1-12-41	R	Grant, JOHN B., C.B.E., M.D., M.P.H., F.A.P.H.A., Director, All-India Institute of Hygiene and Public Health. 110 Chittaranjan Avenue, Calcutta.
7-9-10	N	*Gravelly, FREDERIC HENRY, D.SC., F.N.I., F.R.A.S.B. Museum House, Egmore, Madras.
7-12-42	N	Griffiths, G. B., MAJOR, Frontier Force Rifles. c/o Messrs. Grindlay & Co., Ltd., Bombay.
6-5-40	R	Griffiths, REV. WALTER GERALDSON, B.SC. (CALIF.), B.D. (DREW), M.A. (NEW YORK), PH.D. (DREW), Missionary. 13 Wellington Square, Calcutta.
4-2-25	L	*Guha, B. S., M.A., PH.D. (HARVARD), F.N.I., F.R.A.S.B. Zoological Survey of India, Kaiser Castle, Benares Cantonment.
5-7-43	R	Gupta, HARISH CHANDRA, M.SC. (ALLAHABAD), I.C.S., Additional Land Acquisition Collector. 24/1 Ballygunge Circular Road, Calcutta.
2-11-42	R	Gupta, PRATUL CHANDRA, M.A., PH.D., Lecturer, Calcutta University. 125 Rashbehari Avenue, Calcutta
5-3-19	N	Gupta, SIVAPRASAD. Seva Upavana, Benares City.
5-8-15	R	Gurner, CYRIL WALTER, B.A. (OXON), C.S.I., I.C.S., Chairman, Improvement Trust. 5 Clive Street, Calcutta.
2-8-43	N	Gurunath, MARTI MANNARIAH, M.A., Salt Merchant. 52 Brahmin Colony, Tuticorin, S. India.
1-2-43	R	Habibullah, A. B. M., M.A., PH.D. (LONDON), DIP.LIB. (LONDON), Lecturer, Department of History and Islamic History and Culture, Calcutta University. 11 Bondel Road, Ballygunge, Calcutta.

Date of Election.		
5-2-34	R	Haldar , BHARATI VIKAS, M.A., B.L., <i>Advocate, High Court.</i> 47 Haldarpara Road, Kalighat, Calcutta.
6-9-37	N	Halim , ABDUL, DR., M.A., <i>Lecturer in History, Muslim University.</i> Fida Manzil, Aligarh.
1-11-43	R	Halwasiya , PURUSHOTHAM DASS, <i>Merchant and Zemindar.</i> 47 Mukhtaram Babu Street, Calcutta.
2-4-24	R	Haq , M. MAHFUZ-UL, KHAN SAHIB, M.A., <i>Professor of Arabic and Persian, Presidency College.</i> 8/B Dargah Road, Park Circus, Calcutta.
1-11-43	R	Haralalka , BHAGABANDAS, M.A., <i>Merchant; Secretary, All-Bengal Weavers' Association.</i> 52/1/1 College Street, Calcutta.
1-2-26	F	Harris , H. G. Gunnespory Avenue, Ealing, London.
4-3-40	N	Harshé , RAMKRISHNA GANESH, B.A. (TILAK), D.LIT. (PARIS), <i>Registrar, Deccan College Post-Graduate and Research Institute.</i> Poona.
7-6-43	N	Hasan , ZAHUR-UL, M.A., PH.D., LL.B., <i>Advocate, High Court.</i> 'Gul Afshan', Moradabad, U.P.
2-11-42	R	Hawes , ROBERT MARTIN. 18 Ballygunge Circular Road, Calcutta.
7-8-39	A	Helland , BERNHARD ALVIN, M.A. (MINNESOTA), B.D. (AUGSBURG SEMINARY, U.S.A.), <i>Missionary; Principal, Kaerabani Boys' Middle English and Guru Training School.</i> Kaerabani, via Dumka, Santal Parganas.
2-11-42	R	Hendrie , JAMES HALKETT, <i>Associate Member, Institution of Mechanical Engineers; Major, Bengal Artillery; A.F.I., Manager, Calcutta Branch, Parry & Co., Ltd.</i> 19 British Indian Street, Calcutta.
6-8-28	N	*Heron , A. M., D.SC. (EDIN.), F.G.S., F.R.G.S., F.N.I., F.R.S.E., <i>Formerly Director, Geological Survey of India.</i> Mines and Geology Office, Hyderabad, Deccan.
4-11-35	R	Hirtzel , MICHAEL ARTHUR FREDERICK, O.B.E., M.A. (OXON), <i>Mercantile Assistant, Macneill & Co.</i> 2 Fairlie Place, Calcutta.
1-4-25	R	Hobbs , HENRY, MAJOR, V.D. 21 Old Court House Street, Calcutta.
2-12-40	R	Hodgson , LIONEL LEONARD, <i>Secretary and Treasurer, British and Foreign Bible Society (Calcutta Aux.).</i> Bible House, 23 Chowringhee Road, Calcutta.
2-11-21	L	*Hora , SUNDER LAL, RAI BAHADUR, D.SC., F.Z.S., F.R.S.E., F.N.I., F.R.A.S.B., <i>Director of Fisheries, Bengal.</i> 1 Deodar Street, Ballygunge, Calcutta.
7-6-43	N	Hosain , SAYED MOZAFFAR. Garrison Engineer's Office, Namkum Division, Ranchi.
6-6-23	L	*Howard , SIR ALBERT, KT., C.I.E., M.A., F.R.A.S.B., <i>Late Director, Institute of Plant Industry, Indore, and Late Agricultural Adviser to States in Central India.</i> 14 Liskeard Gardens, Blackheath, London, S.E.3.
7-3-32	R	Hughes , ARTHUR, B.A. (MANCHESTER), I.C.S., <i>Labour Commissioner, Bengal.</i> 8 Clive Street, C. Block, Calcutta.
6-8-34	N	Husain , SYED ATA, M.A. (CAL.), C.E. (ROORKEE), <i>Retired Superintending Engineer, Hyderabad State.</i> Mohalla Lingampally, Hyderabad, Deccan.
6-6-23	A	*Hutton , J. H., C.I.E., I.C.S., M.A., D.SC., F.R.A.S.B. <i>University Museum of Archaeology and Ethnology, Downing Street, Cambridge, England.</i>

Date of Election.		
1-12-41	A	Ingalls, DANIEL HENRY HOLMES, M.A. (HARVARD), Junior Fellow of Society of Fellows, Harvard University. 2/7 Lansdowne Road, Calcutta.
1-2-11	L	Insch, JAMES. 18 Beechwood Avenue, Boscombe, Hants, England.
2-12-40	A	Isch-Wall, CLAUDE, LICENCIÉ-ÈS-SCIENCE (MATHÉMATIQUES ET PHYSIQUES), Lieutenant, British Army. Grand Hotel, Calcutta.
5-11-42	R	Ishaque, MOHAMMED, M.A., B.SC., PH.D. (LOND.), Lecturer, Calcutta University. 159/B Dhurrumtollah Street, Calcutta.
2-5-38	R	Jacob, J. R., Director, Messrs. B. N. Elias & Co.; Merchant and Landholder. Norton Buildings, Old Court House Corner, Calcutta.
1-7-40	N	Jagannath, SRI, M.SC., I.S.R. c/o The General Manager, N.W.Ry., Lahore.
6-6-27	L	Jain, BALDEODAS, Merchant and Banker. 21 Armenian Street, Calcutta.
2-2-21	R	Jain, CHHOTE LAL, M.R.A.S. 174 Central Avenue, Calcutta.
2-12-40	R	Jalan, MOHANLAL, Landlord. c/o Seth Soorajmall Jalan, Smriti Bhawan, 186 Chittaranjan Avenue, Calcutta.
7-4-41	N	Jamal-ud-Din, LIEUT.-COL. 1/A Model Town, Lahore.
1-11-38	R	Jatia, KANAI LALL. 21 Roopchand Roy Street, Calcutta.
4-2-29	R	Jenkins, WALTER ALLEN, C.I.E., D.SC. (SHEFFIELD), I.E.S., Director of Public Instruction, Bengal. United Service Club, Calcutta.
6-12-43	R	Johnson-Marshall, PERCY EDWIN ALAN, DIP.ARCH., A.R.I.B.A., CAPT., R.E., Architect and Planner. c/o Messrs. Grindlay & Co., Ltd., 6 Church Lane, Calcutta.
1-11-11	L	Kamaluddin, AHMAD, SHAMS'UL-ULAMA, M.A., I.E.S. (retd.). 3 Nawab Abdur Rahman Street, Calcutta.
4-5-10	L	*Kemp, STANLEY W., B.A., D.SC., F.R.S., F.R.A.S.B., Secretary of the Marine Biological Association of U.K., and Director of the Plymouth Laboratory. The Laboratory, Citadel Hill, Plymouth, England.
6-3-01	N	*Khan, H. M. HABIBUR RAHMAN, NAWAB SADR YAR JUNG BAHADUR, D.TH. (ALIG.), F.R.A.S.B., Rais. Habibganj, District Aligarh.
3-4-43	R	Khaitan, KALI PRASAD, M.A., B.L., Barrister-at-Law. 6 South End Park, Rashbehari Avenue, Calcutta.
2-8-26	R	Khettry, BENIMADHO, Proprietor, Messrs. Gouri Shanker Khettry, Landholders, Bankers and Merchants. 15 Paggiyapatti, Barabazar, Calcutta.
7-12-42	N	Khosla, A. N., B.A., Writer of Books. Post Box No. 239, Lahore.
3-5-43	R	Khundkar, THE HON'BLE MR. JUSTICE N. A., Judge, Calcutta High Court. 1 Victoria Terrace, Calcutta.
5-2-34	N	Kirby, WALTER, B.SC., Inspector of Mines in India. Dhanbad, E.I.R.
4-11-35	A	Klebe, ANINA, née BRANDT, PH.D. (GREIFSWALD, GERMANY), Psychologist. 26 Royal Court, 5/1 Russell Street, Calcutta.
1-3-26	R	Kramrisch, STELLA (MRS.), PH.D., Lecturer in Ancient Indian History (Fine Arts), Calcutta University. 2/1 Bright Street, Ballygunge, Calcutta.

Date of Election		
4-2-35	R	Lal , RAM BIHARI, M.B.B.S., D.P.H., D.T.M. & H., D.B., F.N.I., <i>Professor of Vital Statistics and Epidemiology, All-India Institute of Hygiene and Public Health.</i> 21 Chittaranjan Avenue, Calcutta.
5-2-40	R	Law , ANANTA CHURN, <i>Attorney-at-Law.</i> 37 Badur Bagan Row, P.O. Amherst Street, Calcutta.
5-2-34	R	Law , BHABANI CHURN, <i>Merchant, Zemindar and Artist.</i> 223 Cornwallis Street, Calcutta.
5-8-14	L	*Law , BIMALA CHURN, M.A., B.L., PH.D., D.LITT., F.R.G.S., F.R.A.S.B. 43 Kailas Bose Street, Calcutta.
1-2-11	R	*Law , NARENDRA NATH, M.A., B.L., PH.D., F.R.A.S.B. 96 Amherst Street, Calcutta.
4-2-35	R	Law , PARBUTTY CHURN. 223 Cornwallis Street, Calcutta.
1-7-14	R	Law , SATYA CHURN, M.A., B.L., PH.D., F.N.I., F.Z.S., M.B.O.U. 50 Kailas Bose Street, Calcutta.
5-7-43	N	Lawson , CHARLES PRICHARD, M.L.A. (CENTRAL), <i>President, European Association.</i> c/o The Imperial Chemical Industries (India), Ltd., 18 Strand Road, Calcutta.
7-6-26	R	Lemmon , RICHARD DENNIS, <i>Merchant.</i> 52/4/1 Ballygunge Circular Road, Calcutta.
1-6-31	L	Lort-Williams , SIR JOHN, KT., K.C., <i>Barrister-at-Law, formerly Offg. Chief Justice, High Court, Calcutta.</i> 2/1 Lansdowne Road, Calcutta.
2-8-05	L	*McCay , DAVID, LT.-COL., I.M.S., M.D., B.CH., B.A.O., M.R.C.P., F.R.A.S.B. c/o The Standard Bank of S. Africa, Hanover, Cape Province, S. Africa.
11-1-93	L	*MacLagan , SIR EDWARD DOUGLAS, K.C.S.I., K.C.I.E., F.R.A.S.B., <i>Formerly Governor of the Punjab.</i> 39 Egerton Terrace, London, S.W.3.
7-6-16	L	Mahajan , SURYA PRASAD. Murarpur, Gaya, E.I.R.
3-3-20	R	Mahalanobis , P. C., M.A., B.SC., F.N.I., F.S.S., I.E.S., <i>Professor of Physics, Presidency College.</i> 210 Cornwallis Street, Calcutta.
2-5-38	R	Mahtab , MAHARAJ KUMAR A. C. Asbab Villa, 14/1 Burdwan Road, Alipur, Calcutta.
3-2-30	N	Mahtab , UDAY CHAND, B.A., <i>Maharajadhiraja Bahadur of Burdwan.</i> The Palace, Burdwan.
6-2-24	A	Mahindra , K. C., B.A. (CANTAB.). Messrs. Martin & Co., 12 Mission Row, Calcutta.
1-12-41	N	Majumdar , DHIRENDRA NATH, M.A., PH.D. (CANTAB.), F.R.A.I., F.N.I. Anthropology Laboratory, Lucknow University, Lucknow.
3-7-39	R	Majumdar , JATINDRA MOHAN, M.A., <i>Deputy Dock Superintendent, Calcutta Port Commissioners.</i> 1 Chowringhee Terrace, Calcutta.
2-2-16	N	Majumdar , NARENDRA KUMAR, M.A. Suri, Birbhum.
4-6-13	R	*Majumdar , RAMESH CHANDRA, M.A., PH.D., F.B.A.S.B., <i>Formerly Vice-Chancellor, Dacca University.</i> 4 Bepin Pal Road, Kalighat, Calcutta.
7-4-41	N	Malik , A. R., <i>Deputy Agricultural Marketing Adviser to the Government of India.</i> Ajmer.
4-11-29	N	Mallya , BANTWAL GANAPATHY, F.R.C.S., M.D., M.B.C.S., LT.-COL., I.M.S., <i>Officer Commanding, War Hospital.</i> Bikaner.

Date of Election.		
5-6-01	F	Mann, HAROLD HART, D.SC., M.SC., F.I.C., F.L.S. Woburn Experimental Station, Aspley Guise, Bedfordshire, England.
2-11-42	R	Matthews, HENRY IDRIS, Director of Factory Recruitment, Indian Ordnance Services. United Service Club, 29 Chowringhee, Calcutta.
4-3-40	R	Mazumdar, DWIJENDRA LAL, B.A. (CANTAB.), I.C.S. 11A Mayfair, Ballygunge, Calcutta.
2-1-28	N	Mello, FROILANO DE, COLONEL, Director-General of Medical Services in Portuguese India, Professor of Parasitology. Nova Gôa.
6-3-39	R	Meyer, MISS SALLY, M.A., Professor of Botany, Bethune College. 11 Sudder Street, Calcutta.
5-11-84	L	*Middlemiss, CHARLES STEWART, C.I.E., F.R.S., B.A., F.G.S., F.R.A.S.B. Aviemore, Crowborough, Sussex, England.
4-1-43	N	Millar, GUY DENNY LAWRENCE, F.R.G.S., F.I.S.A., Manager, The Kachariguon Tea Co., Ltd. P.O. Borjuli, Assam.
1-2-26	N	*Mills, JAMES PHILIP, C.I.E., I.C.S., M.A. (OXON), J.P., F.N.I., F.R.A.S.B. Secretariat, Shillong, Assam.
3-3-41	R	Mitra, MISS PRITI, M.A., Research Student. 14 Chowringhee Terrace, Calcutta.
5-3-24	N	Mitter, SIR B. L., K.C.S.I., M.A., B.L., Barrister-at-Law, Advocate-General, Federal Court. New Delhi.
5-4-26	R	Mitter, KHAGENDRA NATH, RAI BAHADUR, M.A., Ramtanu Lahiri Professor of Bengali Language and Literature, Calcutta University. 6 Ballygunge Place, Calcutta.
30-9-35	R	Mitter, SUDHIR CHUNDER, Barrister-at-Law. 19 Camac Street, Calcutta.
2-11-42	N	Mitra, MAJOR BHUPENDRA NATH, D.SC. (DACCA), PH.D. (MINNESOTA), F.I.C., SIGMA XI. c/o Inspectorate of Military Explosives, Kirkee, Poona.
4-10-43	R	Mitter, SUSHIL CHANDRA, M.A. (CAL.), D.LITT. (PARIS), Writer and Research Scholar. 10/1/A Mahesh Chaudhuri Lane, Bhowanipur, Calcutta.
7-12-36	R	Mittra, S. C. 34 Shampukur Street, Calcutta.
1-11-26	A	Modi, JAL R. K., B.A. 4 Camac Street, Calcutta.
5-3-34	R	Modi, JEHANGIR JEEVANJI JAMSHEDJI, Merchant. 183 Dhurrumtollah Street, Calcutta.
5-11-24	R	Mookerjee, SIR B. N., KT., B.A. (CANTAB.), Partner, Messrs. Martin & Co. 12 Mission Row, Calcutta.
2-7-24	R	Mookerjee, SYAMAPRASAD, M.A., B.L., LL.D., D.LITT., Barrister-at-Law, Formerly Minister, Government of Bengal. 77 Asutosh Mookerjee Road, Calcutta.
5-4-37	N	Mooney, H. F., O.B.E., M.A., I.F.S., Forest Adviser, Eastern States. Sambalpur, B.N.Ry., Orissa.
4-1-43	R	Morton, SIR GEORGE B., KT., O.B.E., M.C. c/o Messrs. Bird & Co., Chartered Bank Buildings, Calcutta.
5-7-37	A	Mozumdar, SUPRABHAT, Master, Rajkumar College. Staff Club, Raipur, C.P.
4-12-39	R	Mukerjee, JYOTISH CHANDRA, Formerly Chief Executive Officer, Calcutta Corporation. 28 Camac Street, Calcutta.
6-3-39	N	Mukerjee, S. C., Retired Member of the Indian Civil Service. 'Westward Ho', Happy Valley, Mussoorie, U.P.
2-2-21	N	Mukerjee, SUBODH CHANDRA, SHASTRI, M.A., DOCTEUR-ES-LETTRES (PARIS), Head of the Dept. of Sanskrit, Hindu University. Benares.

Date of Election.		
1-2-43	N	Mukerjee, S. K. , M.Sc., Ph.D., <i>Curator of Herbarium, Lloyd Botanic Garden. Darjeeling.</i>
5-7-37	R	Mukerji, PANNALAL, RAI BAHADUR , <i>Zemindar and Honorary Magistrate. 7 Rajmohan Road, Uttarpura, Hooghly.</i>
2-8-26	R	*Mukherjee, JNANENDRA NATH , C.B.E., D.Sc. (LONDON), F.C.S. (LONDON), F.N.I., F.R.A.S.B., <i>Ghose Professor of Chemistry, University of Calcutta. 92 Upper Circular Road, Calcutta.</i>
5-7-26	R	Mukhopadhyaya, PRABHAT KUMAR , M.A., <i>Research Assistant, Calcutta University. 6 Hindusthan Park, Ballygunge, Calcutta.</i>
2-2-21	R	Mukhopadhyaya, RAMAPRASAD , M.A., B.L. 77 Asutosh Mukherjee Road, Bhawanipore, Calcutta.
3-5-43	R	Mullan, CHARLES SAMUEL , C.I.E., M.A., I.C.S., <i>Commissioner of Income Tax, Bengal. U.S. Club, Calcutta.</i>
2-4-28	R	Mullick, KARTICK CHURN, KUMAR , <i>Director, Raja D. N. Mullick & Sons, Ltd. Colootola Rajbati, Chittaranjan Avenue, Calcutta.</i>
7-5-28	N	Murray, EUGENE FLORIAN OLIPHANT , A.I.M.M., F.G.S., <i>Mining Geologist and Engineer. Tatanagar, B.N.Ry.</i>
5-6-39	R	Nag, KALIDAS , M.A. (CAL.), D.LITT. (PARIS), <i>Lecturer, Calcutta University. P.26 Raja Basanta Roy Road, Lansdowne Road Extension, Calcutta.</i>
5-12-27	L	Namgyal, H.H. MAHARAJA SIR TASHI , K.C.I.E., <i>Maharaja of Sikkim. Gangtok, Sikkim.</i>
6-6-27	N	Nandi, MAHARAJA SRIS CHANDRA , M.A., M.L.C., <i>Zemindar. Kasimbazar Rajbari, Kasimbazar, Murshidabad.</i>
5-2-34	N	Nariman, RUSTOM, K. , M.I.C.E., A.C.H., F.R.G.S. (<i>Retired Superintending Engineer, Punjab Irrigation</i>), <i>Professor of Engineering, Osmania University. c/o The Union Bank of India, Fort, Bombay.</i>
5-3-28	R	Neogi, PANCHANAN , M.A., Ph.D., F.N.I., I.E.S. (retd.), <i>Principal, Maharaja Mahindra Chandra College. 44A New Shambazar Street, Calcutta.</i>
3-11-30	N	Newman, CARL DAMIEN , M.B., B.S., D.T.M. & H., D.P.H., <i>Chief Medical Officer. 6 Mayo Gardens, Lahore.</i>
3-12-24	N	Newman, CHAS. F. , F.R.G.S., M.R.S.T., M.C.P. <i>Ramnagar, Benares.</i>
2-11-42	R	Norman, G. A. S. , <i>Agent, The Standard Life Assurance Co., Ltd. 32 Dalhousie Square, Calcutta.</i>
7-4-15	L	Ohtani, COUNT KOZUI . <i>San-ya-so, Edomachi, Fushimi, Kyoto, Japan.</i>
1-5-39	A	Parker, E. , CAPT., I.A. (retd.). <i>c/o Remington Rand Inc., 3 Council House Street, Calcutta.</i>
5-2-34	N	Pasricha, CHIRANJI LAL , M.A., M.B., B.CHIR. (CANTAB.), M.R.C.S. (ENG.), L.R.C.P. (LOND.), MAJOR, I.M.S., <i>Combined Indian Military Hospital. Dehra Dun, U.P.</i>
5-2-40	R	Pask, JOHN DAVID , B.Sc., Ph.D. (LEEDS), <i>Chief Chemist, Howrah Mills Co., Ltd. Ramkrishnapur, Howrah.</i>
2-6-41	R	Paterson, EDWARD ALFORD , <i>Assistant, Jardine, Skinner & Co., Ltd. 4 Clive Row, Calcutta.</i>
6-6-88	L	Pennell, AUBREY PERCIVAL , M.A., <i>Barrister-at-Law. St. Canon's Tower, Loch Awe, Argyll, Scotland.</i>

Date of Election.		
5-2-34	N	Percival , FREDERICK GEORGE, O.B.E., PH.D. (LOND.), F.G.S., General Superintendent, Ore Mines and Quarries, Tata Iron and Steel Co. 3 Beldih Lake, Jamshedpur.
1-4-25	R	Perier , FERDINAND, S.J., Most Reverend the Archbishop of Calcutta. 32 Park Street, Calcutta.
3-6-40	A	Poleman , HORACE IRVIN, B.A., M.A., PH.D., Director of Indic Studies, Library of Congress. Washington, D.C., U.S.A.
3-4-18	L	*Prashad , BAINI, O.B.E., D.SC., F.Z.S., F.R.S.E., F.N.I., F.R.A.S.B., Director, Zoological Survey of India. Kaiser Castle, Benares Cantonment.
3-8-25	N	*Pruthi , HEM SINGH, M.SC., PH.D. & SC.D. (CANTAB.), F.N.I., F.R.A.S.B., Imperial Entomologist, Imperial Institute of Agricultural Research. New Delhi.
3-12-24	R	Pushong , E. S., M.D., L.S.A., Medical Practitioner. 1 Chapel Road, Hastings, Calcutta.
1-3-43	R	Rahman , A. F. M. KHALILUR, B.A. (LONDON), PH.D., Special Officer, Current Problems, Government of Bengal. 103 Ballygunge Place, Calcutta.
3-11-30	R	Rahman , SHAH KALIMUR, M.A., Professor of Arabic and Persian, Calcutta University. 51 Baitakhana Road, Calcutta.
3-5-43	N	Rajgarhia , CHAND MULL, Mining Engineer. Giridih, E.I.R.
7-9-36	N	Ram , DOULAT, Accountant, Military Secretary's Office. c/o Messrs. Biru Mal Chiranji Lal, Chhatla Magni Ram, Patiala.
4-1-43	N	Ramabhadran , N., B.A., Prosecuting Sub-Inspector of Police. Dindigul, S. India.
2-10-39	N	Rangarajam , KRISHNASWAMI, Employee, I.C.I. (India) Ltd. Rukmani Building, Mambalam West, Madras.
1-2-26	N	Rao , Y. RAMACHANDRA, RAO BAHADUR, M.A., F.R.E.S., formerly Locust Research Entomologist Govt. of India. 199 Visvesvarapuram, Bangalore City.
1-9-41	R	Ratcliff , GEORGE MASSEY, B.A. (CANTAB.), I.O.S. Upper Flat, 9 Queen's Park, Ballygunge, Calcutta.
3-8-42	N	Rath , PURNA CHANDRA, B.A., DIP.ED., Superintendent of Archaeology, Patna State. P.O. Balangir, E.S.A.
7-9-21	N	Ray , HEM CHANDRA, M.A., PH.D. (LONDON), D.LIT. (LONDON), Professor and Head of the Department of History, University College. Colombo, Ceylon.
5-1-21	N	Ray , JAGADISNATH, MAHARAJA, Maharaja of Dinajpore. Dinajpore.
1-3-43	R	Ray , NIHAR-RANJAN, M.A., D.LITT. & PHIL. (LEIDEN), DIP.LIB. (LONDON), F.L.A., University Librarian and Post-graduate Lecturer. Central Library, Calcutta University, Calcutta.
3-2-41	N	Ray , NIROD BHUSHAN, Professor of History, A. M. College. Suburban Road, Mymensingh.
5-3-90	R	*Ray , SIR PROFULLA CHANDRA, KT., C.I.E., D.SC., F.N.I., F.R.A.S.B. University College of Science, 92 Upper Circular Road, Calcutta.
7-7-41	N	Ray , SATIS CHANDRA, M.A., D.P.I. Shillong, Assam.
1-7-40	R	Ray , SUKUMAR, M.A., Lecturer, Calcutta University. 22-A Southern Avenue, Mitter Mansions, Suite No. 6, P.O. Kalighat, Calcutta.

Date of Election.		
4-12-39	R	Ray-Chowdhury, H. C., M.A., P.I.D., Carmichael Professor of Ancient Indian History and Culture, Calcutta University. 6 Mysore Road, Kalighat, Calcutta.
3-2-41	N	Reddy, B. RANGA, Joint Revenue Secretary, H.E.H. the Nizam's Government. Bholakpur, Secunderabad, Deccan.
5-11-28	L	Reinhart, WERNER, Merchant. c/o Messrs. Volkart Bros., Rychenberg, Winterthur, Switzerland.
3-11-41	A	Reynolds, REV. HERMAN, M., M.A., B.D., Missionary. Pendra Road, C.P.
2-4-24	F	Richards, F. J., I.C.S. Treeps, Hurstpier Point, Sussex, England.
3-12-24	L	Roerich, GEORGE NICHOLAS, M.A., M.R.A.S., Orientalist. 310 Riverside Drive, New York, U.S.A. ('Urusvati', Naggar, Kulu, Punjab).
2-7-28	L	Roerich, NICHOLAS, Honorary President, Master Institute of United Arts, New York, U.S.A.; Artist-Painter. 310 Riverside Drive, New York, U.S.A.
5-7-43	N	Rolles, REV. MONTAGUE JOHN, Missionary, London Mission. Kamalapuram, Dt. Cuddappah, Madras Presidency.
5-6-33	A	Rossetti, FELIX FRANCIS LEO, B.SC., B.H., Secretary, Y.M.C.A. 42 Corporation Street, Calcutta.
7-4-41	R	Roxburgh, THE HON'BLE MR. JUSTICE T. J. Y., C.I.E., I.C.S., Barrister-at-Law, Judge, High Court. 6 Lee Road, Calcutta.
6-12-26	N	Roy, THE HON'BLE SIR A. K., KT., Barrister-at-Law, Law Member, Government of India. New Delhi.
5-2-40	R	Roy, B. C., B.A., M.D., F.R.C.S. (ENG.), M.R.C.P. (LOND.), F.S.M.F. (BENGAL), Vice-Chancellor, Calcutta University. 36 Wellington Street, Calcutta.
5-4-37	N	Roy, DAVID, M.B.E., Dewan, Myelliem Chevra States. Shillong, Assam.
1-12-30	N	Roy, RAJA KAMALARANJAN, B.A., Zemindar. Kasimbazar Post, Dt. Murshidabad.
5-7-43	R	Roy, SUDHINDRA NATH, M.A., Landlord. 3, Tiloke Road, Ballygunge, Calcutta.
4-1-43	R	Sadeque, A., M.A. (ECON.), Professor, Islamia College. 177-B Park Street, Calcutta.
7-5-28	R	*Saha, MEGHNAD, D.SC., F.R.S., F.N.I., F.R.A.S.B., Palit Professor of Physics, Calcutta University. 92 Upper Circular Road, Calcutta.
6-9-43	L	Sahu, LAKSHMINARAYAN, M.A., Member, Servant of India Society. Idigapadia, Cuttack.
5-2-34	L	Sale, HAROLD MONTAGUE, M.A., F.G.S. Mancetter Cottage, Atherstone, Warwickshire, England.
3-5-43	N	Sanyal, PROBODH CHANDRA, B.A. Nawadwip, Bengal.
4-10-43	N	Saran, PARAMATMA, M.A. (BENARES), PH.D. (LONDON), Lecturer in History, Benares Hindu University. Benares.
4-2-35	R	Sarkar, NALINI RANJAN, Formerly Member, Viceroy's Council. 237 Lower Circular Road, Calcutta.
5-4-37	R	Sattar, THE HON'BLE MR. A. R. H. A., Member, Council of State. 32 Ezra Street, Calcutta.
3-6-40	N	Seal, JOHN ROBERT, M.B.E. c/o Grand Hotel, Simla, H.O.
6-3-33	R	Seal, SATIS CHANDRA, M.A., B.L., Honorary Secretary, Indian Research Institute. 170 Maniktola Street, Calcutta.

Date of Election.		
1-3-43	R	Sen, ANIL KUMAR, M.B. (CAL.), <i>Director of Laboratories of Biological Research and Experimental Therapy, B.C.P.W. 45 Ballygunge Place, Calcutta.</i>
1-4-25	R	Sen, BENOY CHANDRA, M.A., PH.D. 40 Dr. Sarat Banerjee Road, Ballygunge, Calcutta.
9-12-36	R	Sen, D. N. 7 Rawdon Street, Calcutta.
1-6-36	N	Sen, J. M., RAI BAHADUR, M.ED. (LEEDS), B.SC. (CAL.), T.D. (LOND.), DIP.ED. (OXFORD), F.R.G.S., F.N.I. <i>Principal, Krishnagar College. Krishnagar, Nadia.</i>
5-12-23	L	Sen, LAKSHMAN, H.H. RAJA OF SUKET. Suket State, Punjab.
3-5-43	R	Sen, KARUNAKETAN, B.SC., I.C.S., <i>Special Officer, Directorate of Civil Supplies, Bengal.</i> 5/A Heysham Road, P.O. Elgin Road, Calcutta.
5-4-37	N	Sen, KSHITI MOHAN. <i>Principal, Visvabharati.</i> Santiniketan, Dist. Birbhum.
1-2-43	R	Sen, NEPAL CHANDRA, C.B.E., RAI BAHADUR, M.A., <i>Director of Land Records and Surveys, Bengal.</i> 35 Gopalnagar Road, Alipur, Calcutta.
5-2-40	N	Sen, SURESH CHANDRA, B.SC. (CAL.), B.A. (CANTAB.), A.M.I.CHEM.E. (LONDON), <i>Superintendent, Cinchona Cultivation in Bengal.</i> Mungpoo, Riyand, D.H.Ry.
4-1-43	N	Sen-Gupta, JOGENDRA NATH, M.B. (CAL.), Oak Lodge, Darjeeling.
1-4-29	R	Sen-Gupta, NARES CHANDRA, M.A., D.L., <i>Advocate, High Court.</i> P.93 Manoharpukur Road, Calcutta.
5-7-11	L	*Sewell, ROBERT BERESFORD SEYMOUR, C.I.E., M.A., SC.D. (CANTAB.), M.R.C.S., L.R.C.P., F.Z.S., F.L.S., F.R.S., F.N.I., F.R.A.S.B., LT.-COL. I.M.S., <i>Director, Zoological Survey of India (ret'd.).</i> 18 Barrow Road, Cambridge, England.
5-4-37	N	Sharaf-ud-Din, S., M.A., B.L., <i>Vice-Principal, Islamia Intermediate College.</i> Dacca.
2-11-25	N	Sharif, MOHAMMAD, D.SC., F.R.M.S., F.L.S., F.N.I., <i>Entomologist, Haffkine Institute.</i> Parel, Bombay.
6-5-29	N	Sharma, SRI RAM, M.A., F.R.HIST.S. (LONDON), <i>Principal, D.A.V. College.</i> Srinagar, Kashmir.
3-2-41	L	Shastri, GANGEYANAROTTAM, KAVYATIRTHA, KAVICAKRA-CUDAMANI, Landholder. Gangeya Bhawan, 280 Chittaranjan Avenue, Calcutta.
5-8-35	N	Shattock, JOHN SWITHIN HARVEY, M.B.E., B.A. (OXON), I.C.S., <i>Secretary to the Resident for Baroda and the Gujerat States.</i> The Residency, Baroda.
2-5-23	A	Shebbeare, E. O., <i>Chief Game Warden.</i> Post Box No. 376, Kuala Lumpur, F.M.S.
6-1-09	N	Shirreff, ALEXANDER GRIERSON, B.A., I.C.S., <i>Adviser to H.E. The Governor of U.P.</i> -U.S. Club, Lucknow.
6-2-28	L	Shumser, JUNG BAHADUR RANA, SIR KAISER, K.B.E., <i>SURPRADIPTA MANYAVARA, LIEUT.-GENERAL. Nepalese Army.</i> Kaiser Mahal, Kathmandu, Nepal.
4-11-29	R	*Siddiqi, MOHAMMAD ZUBAYR, M.A., B.L., PH.D. (CANTAB.), <i>Sir Asutosh Professor of Islamic Culture, Calcutta University.</i> P.6 Suhrawardy Avenue, Calcutta.
6-2-39	A	Simeons, ALBERT THEODORE WILLIAM, M.D. (HEIDELBERG), <i>Physician, Khatau Mansion, Cooperage, Bombay.</i>
5-3-13	L	*Simonsen, JOHN LIONEL, D.SC., F.I.C., F.R.S., F.R.A.S.B., <i>Director of Colonial Products Research, Imperial Institute.</i> Exhibition Road, South Kensington, London, S.W.7.

Date of Election.		
6-3-39	F	Sinclair , GREGG M., <i>Director, Oriental Institute, and President, University of Hawaii.</i> Honolulu, Hawaii, U.S.A.
6-2-18	N	Singh , MANYABARA BADA KAJI MARICHI MAN, PANDITJI, C.I.E. 38 Khichapokhari, Kathmandu, Nepal.
5-3-34	L	Singh , HIS HIGHNESS THE HON'BLE MAHARAJADHIRAJA SIR KAMESWAR, K.C.I.E. Darbhanga.
5-7-43	R	Singh , PARTAP, <i>Merchant and Industrialist.</i> Grosvenor House, Calcutta. 181 Grand Trunk Road, North, Howrah.
2-1-33	N	Singh , RUDRA PERTAB, RAO BAHADUR, <i>Proprietor, Sonbarsa Raj.</i> Sonbarsa P.O., District Bhagalpore.
5-9-12	R	Singhi , BAHADUR SINGH. (Azimganj. Murshidabad). 48 Gariahat Road, Calcutta.
7-8-33	L	Sinh , RAGHUBIR, RAJKUMAR, M.A., LL.B., <i>Heir-Apparent of Sitamau State.</i> Raghbir Niwas, Sitamau, C.I.
5-7-43	N	Sinha , ANANDA PROSAD, M.A., PH.D., 'Lalita-nilaya', P.O. Katwa, Dt. Burdwan.
4-1-26	N	Sinton , J. A., O.B.E., LT.-COL., I.M.S., V.C., <i>Officer-in-Charge, Malaria Bureau.</i> Central Research Institute, Kasauli.
5-7-16	L	Sircar , GANAPATI, VIDYARATNA. 69 Beliaghata Main Road, Calcutta.
3-9-34	R	Sondhi , VED PALL, M.B.E., M.SC., F.G.S., <i>Assistant Superintendent, Geological Survey of India.</i> 27 Chowringhee, Calcutta.
1-9-42	F	Spendlove , F. ST. G. DE, <i>Assistant Keeper, Later European Collection, The Royal Ontario Museum of Archaeology.</i> Toronto, S. Canada.
7-3-23	F	Stamp , L. DUDLEY, B.A., D.SC. University of London, London School of Economics, Houghton Street, London, W.C.2.
28-9-04	L	*Stapleton , HENRY ERNEST, M.A., B.SC., D.LITT., F.R.A.S.B., <i>Formerly Director of Public Instruction, Bengal.</i> St. Brelade, Jersey, C.I., England.
4-8-41	N	Subramanyam , R. A., <i>General Manager, Bharat Sugar Works.</i> Pachrukhi.
5-4-43	R	Sukul , L., <i>Professor, Calcutta University.</i> Kent House, Mission Row Extension, Calcutta.
3-3-20	N	Sundara Raj , BUNGURU, DEWAN BAHADUR, M.A., PH.D., F.N.I., <i>Fisheries Development Officer.</i> Civil Secretariat, U.P., Lucknow.
7-11-32	L	Suvarna , SHUMSER JUNG BAHADUR RANA, <i>Major-General in the Nepalese Army.</i> Singha Darbar, Kathmandu, Nepal.
1-6-04	L	*Tipper , GEORGE HOWLETT, M.A., F.G.S., M.INST.M.M., F.R.A.S.B. 'The Laurels', Glebe Road, Cambridge, England.
3-2-41	R	Tribedi , B. P., M.B. (CAL.), D.B. (LOND.), <i>Professor of Pathology, Medical College, and Bacteriologist to the Government of Bengal, Medical College.</i> Calcutta.
3-5-43	R	Tyson , G. W., C.I.E., <i>Editor, 'Capital'.</i> 4 Lyons Range, First Floor, Calcutta.
5-7-26	N	Tyson , JOHN DAWSON, C.B.E., M.A. (OXON), I.C.S., J.P., <i>Secretary to the Government of India, Department of Education, Health and Lands.</i> New Delhi.

Date of Election.		
4-1-37	R	Vedantatirtha , NARENDRA CHANDRA, M.A., BAGCHI, BHATTACHARJA, SANKHYATIRTHA, MIMAMSATIRTHA, TATTVARATNA, SASTRI, <i>Author and Editor of Books</i> . 49 Cornwallis Street, Calcutta.
7-8-33	R	Vedantatirtha , VANAMALI, M.A., <i>Formerly Professor, Cotton College, Gauhati</i> . 8/4-E Nepal Bhattacharya Lane, Kalighat, Calcutta.
7-4-41	N	Vicary , REV. THOMAS C., M.A. (LOND.), A.K.C., <i>Missionary Principal, Union Christian Training College</i> . Berhampore, Bengal.
6-3-01	L	*Vogel , JEAN PHILIPPE, LITT.D., F.R.A.S.B. Noordeindeplein 4a, Leiden, Holland.
27-9-94	L	Vost , WILLIAM, LT.-COL., I.M.S. 'Woodhurst', Manor Way, South Croydon, Surrey, England.
6-5-25	N	*Wadia , D. N., M.A., B.SC., F.R.G.S., F.N.I., F.R.A.S.B., <i>Government Mineralogist</i> . Torrington Square, Colombo, Ceylon.
5-3-28	R	Waight , HARRY GEORGE, M.A. (OXON), PH.D., I.C.S. 5/2 Wellesley Place, Calcutta.
6-2-33	N	Wellsted , THOMAS ARTHUR, A.R.S.M., B.SC., ASSOC.INST.-M.M., <i>Mining Engineer</i> . Mansar, P.O. Kandri, Ramtek, C.P.
6-2-33	R	West , WILLIAM DIXON, M.A. (CANTAB.), F.N.I., <i>Geologist, Geological Survey of India</i> . 27 Chowringhee, Calcutta.
1-11-26	R	Westcott , FOSS, MOST REVEREND, D.D. (CANTAB.), HONORARY D.D. (OXON), <i>Lord Bishop of Calcutta and Metropolitan of India, Burma and Ceylon</i> . Bishop's House, 51 Chowringhee, Calcutta.
19-9-06	L	*Whitehead , RICHARD BERTRAM, LITT.D., F.R.A.S.B., I.C.S. (retd.). 30 Millington Road, Cambridge, England.
7-9-36	R	Williams , N. T., Messrs. Orr Dignam & Co. 24 Alipur Road, Calcutta.
1-4-08	R	Wordsworth , WILLIAM CHRISTOPHER, C.I.E., M.A., I.E.S. (retd.) c/o The 'Statesman', Chowringhee Square, Calcutta.
2-11-42	R	Wright , E. W., <i>Manager, Northern Assurance Co., Ltd.</i> 7 Hare Street, Calcutta.
5-2-19	N	*Yazdani , GHULAM, O.B.E., M.A., F.R.A.S.B., <i>Formerly Epigraphist to the Government of India for Persian and Arabic Inscriptions</i> . Office of the History of the Deccan, Hyderabad, Deccan.
2-10-39	N	Zafar Hasan , MAULVI, KHAN BAHADUR, O.B.E. Nasheman, Delhi Gate, Delhi.
7-6-43	R	Zakariah , ABU KAZEM MOHAMMED, <i>Ex-Mayor of the City of Calcutta; Ex-Member, Calcutta Port Trust; Fellow, Calcutta University, etc.</i> 68 Syed Ameer Ali Avenue, Calcutta.

LIFE MEMBERS

(Chronological)

	5-11-84	C. S. Middlemiss (30 N.).	3-4-18	B. Prashad (29 R.).	
	6-6-88	A. P. Pennell (88 F.).	2-11-21	S. L. Hora (30 N.).	30
	11-1-93	Sir Edward D. MacLagan (94 R.).	6-6-23	Sir A. Howard (30 N.).	
	27-9-94	W. Vost (94 F.).	1-8-23	Kalipada Biswas (36 R.).	
5	6-2-01	J. Ph. Vogel (25 F.).	5-12-23	B. N. Chopra (40 N.).	
	2-7-03	F. Doxey (28 R.).	5-12-23	H. H. Lakshman Sen (24 N.).	
	1-6-04	G. H. Tipper (27 N.).	7-5-24	B. Bhattacharya (24 N.).	35
	3-8-04	Sir Lewis L. Fermor (36 N.).	6-8-24	L. M. Davies (24 N.).	
	28-9-04	H. E. Stapleton (26 R.).	3-12-24	G. Roerich (28 F.).	
10	2-8-05	D. McCay (29 F.).	4-2-25	B. S. Guha (40 N.).	
	3-1-06	J. A. Chapman (28 N.).	6-6-27	B. D. Jain (28 R.).	
	19-7-06	R. B. Whitehead (26 N.).	4-7-27	C. Chakravarti (41 N.).	40
	3-7-07	J. Coggin Brown (28 N.).	5-12-27	H.H. Sir Tashi Namgyal (27 N.).	
	3-7-07	W. A. K. Christie (29 N.).	5-12-27	H.H. Kunzang Dechhen (27 N.).	
15	1-1-08	Sir U. N. Brahma- chari (27 R.).	6-2-28	Sir D. Ezra (28 R.).	
	7-4-09	C. A. Bentley (30 N.).	6-2-28	Sir Kaiser Shumsher Jung Bahadur Rana (28 N.).	
	4-5-10	S. B. Dhavle (10 N.).	2-7-28	N. Roerich (28 F.).	45
	4-5-10	S. W. Kemp (29 F.).	5-11-28	W. Reinhart (28 F.).	
	1-2-11	James Insch (28 R.).	3-3-30	H. S. Ashton (30 N.).	
20	5-7-11	R. B. S. Sewell (28 N.).	5-1-31	P. Evans (31 N.).	
	1-11-11	Kamaluddin Ahmad (24 N.).	1-6-31	Sir John Lort-Wil- liams (40 N.).	
	5-3-13	J. L. Simonsen (19 N.).	7-11-32	Suvarna Shumser Jung Bahadur Rana (32 N.).	50
	5-11-13	Sir C. S. Fox (40 N.).	6-2-33	J. C. Ghatak (33 R.).	
	4-3-14	J. Bacot (14 F.).	2-8-33	R. Sinh (43 N.).	
25	5-8-14	B. C. Law (33 R.).	5-2-34	H. M. Sale (34 N.).	
	7-4-15	Count K. Ohtani (39 F.).	5-3-34	H.H. Sir K. Singh (34 N.).	55
	7-6-16	S. P. Mahajan (43 N.).	3-2-41	G. Shastri (41 R.).	
	5-7-16	G. Sircar (29 N.).	2-11-42	M. C. Dhiman (42 R.).	
			6-9-43	L. Sahu (43 N.).	

SPECIAL ANNIVERSARY HONORARY MEMBERS

Date of Election.	<i>(Science.)</i>
15-1-34	PROF. ALBERT EINSTEIN, c/o Princeton University, New Jersey, U.S.A.
15-1-34	M. A. LACROIX, Secrétaire Perpetuel, Académie des Sciences, Paris.
15-1-34	DR. SIR SVEN HEDIN, Stockholm, Sweden.

(Letters.)

15-1-34	SIR JOHN H. MARSHALL, K.T., C.I.E., LITT.D., F.S.A., F.B.A., c/o Messrs. Grindlay & Co., Ltd. 54 Parliament Street, London.
15-1-34	PROF. TAHA HOSAIN, Cairo.
15-1-34	PROF. ARTHUR CHRISTENSEN, 62 Raadhusvej, Charlottenlund, Denmark.
15-1-34	DR. J. VAN KAN, President, Royal Society of Arts and Letters, Batavia, Java.
15-1-34	H.R.H. PRINCE DAMRONG RAJANUBHAB OF THAILAND, Thailand.

ASSOCIATE MEMBERS

Date of Election.	
1-2-22	*PIERRE JOHANNIS, REV., S.J., B.LITT. (OXON), <i>Professor of Philosophy</i> . St. Xavier's College, 30 Park Street, Calcutta.
1-2-22	*ANANTAKRISHNA SASTRI, MAHAMAHOPADHYAYA, VEDANTA-VISARADA, <i>Lecturer in Sanskrit</i> , Calcutta University. 32 College Square, Calcutta.
4-12-39	MISS MAUDE LINA WEST CLEGHORN, F.L.S., F.E.S. c/o. The Imperial Bank of India, Park Street, Calcutta.
4-3-40	MRS. E. W. E. MACFARLANE, D.SC. c/o Burma Shell, Budge Budge.
2-11-42	P. C. SEN-GUPTA, M.A., <i>Retired Professor of Mathematics</i> , Bethune College. 3-B Deshpriya Park Road, Ballygunge, Calcutta.
4-1-43	W. BIRNEY. c/o Messrs. Johnston & Hoffman, 10 Chowringhee, Calcutta.

* Re-elected for a further period of five years on 7-12-1942 under Rule 2c.

INSTITUTIONAL MEMBERS

Date of Election.		
28-10-29	Legatum Warnerianum (Oriental Department), University of Leyden, Leyden, Holland.	
2-12-29	Adyar Library, Adyar, Madras S.	
4-5-31	Benares Hindu University Library, Benares.	
1-6-31	Ohtani University Library, Kyoto, Japan.	
7-12-31	Annamalai University Library, Annamalainagar, Chidambaram, S. India.	5
30-10-33	Allahabad University Library, Allahabad.	
30-4-34	Bombay University Library, Bombay.	
6-1-36	Islamia College, Peshawar.	
4-5-36	Patna College, Patna.	
7-12-36	Forest Research Institute, Dehra Dun.	10
4-1-37	Dacca University, Dacca.	
7-6-37	Agra University, Agra.	

ORDINARY FELLOWS

Date of Election.		
2-2-10	Sir Prafulla Chandra Ray, KT., C.I.E., M.A., D.SC., F.N.I.	
7-2-12	C. S. Middlemiss, C.I.E., B.A., F.G.S., F.R.S.	
5-2-13	J. Ph. Vogel, PH.D., LITT.D.	
5-2-13	S. W. Kemp, B.A., D.SC., F.R.S.	
3-2-15	G. H. Tipper, M.A., F.G.S., M.INST.M.M.	5
2-2-16	Sir Richard Burn, KT., C.S.I.	
2-2-16	Sir L. L. Fermor, KT., O.B.E., A.R.S.M., D.SC., F.G.S., M.INST.M.M., F.R.S., F.N.I.	
7-2-17	F. H. Gravely, D.SC., F.N.I.	
6-2-18	J. L. Simonsen, D.SC., F.I.C., F.R.S.	
6-2-18	D. McCay, M.D., M.R.C.P.	10
5-2-19	J. Coggin Brown, O.B.E., M.I.M.E., F.G.S.	
5-2-19	W. A. K. Christie, B.SC., PH.D., M.INST.M.M.	
5-2-19	D. R. Bhandarkar, M.A., PH.D.	
5-2-19	R. B. Seymour Sewell, C.I.E., M.A., SC.D., M.R.C.S., L.R.C.P., F.L.S., F.Z.S., F.R.S., F.N.I.	
2-2-21	Sir U. N. Brahmachari, KT., M.A., PH.D., M.D., F.S.M.F., F.N.I.	15
6-2-28	H. E. Stapleton, M.A., D.LITT., B.SC.	
6-2-28	B. Prashad, O.B.E., D.SC., F.Z.S., F.R.S.E., F.N.I.	
6-2-28	C. A. Bentley, C.I.E., M.B., D.P.H., D.T.M. & H.	
4-2-29	Sir Albert Howard, KT., C.I.E., M.A.	
4-2-29	J. H. Hutton, C.I.E., M.A., D.SC.	20
4-2-29	Sir Edward D. MacLagan, K.C.S.I., K.C.I.E.	
3-2-30	S. L. Hora, D.SC., F.Z.S., F.R.S.E., F.N.I.	
3-2-30	J. P. Mills, C.I.E., I.C.S., M.A., J.P., F.N.I.	
3-2-30	Meghnad Saha, D.SC., F.R.S., F.N.I.	
2-2-31	S. Krishnaswami Aiyangar, M.A., PH.D., F.R.HIST.S.	25
2-2-31	Sir R. N. Chopra, KT., C.I.E., M.A., M.D., SC.D., F.N.I.	
2-2-31	R. B. Whitehead, LITT.D.	
1-2-32	J. Bacot.	
6-2-33	Percy Brown, O.B.E., A.R.C.A.	

	Date of Election.	
30	6-2-33	Ordhendra Coomar Gangoly, B.A.
	6-2-33	Ghulam Yazdani, O.B.E., M.A.
	5-2-34	D. N. Wadia, M.A., B.Sc., F.R.G.S., F.N.I.
	3-2-36	Suniti Kumar Chatterji, M.A., D.LITT.
35	3-2-36	A. M. Heron, D.Sc., F.G.S., F.R.G.S., F.R.S.E., F.N.I.
	3-2-36	H. M. Habib-ur-Rahman Khan, D.TH.
	15-2-37	K. N. Bahl, D.Sc., D.PHIL., F.N.I.
	15-2-37	K. N. Dikshit, M.A.
40	15-2-37	N. N. Law, M.A., B.L., PH.D.
	15-2-37	J. N. Mukherjee, C.B.E., D.Sc., F.O.S., F.N.I.
	6-2-39	Sir Cyril S. Fox, KT., D.Sc., M.I.M.E., F.G.S., F.N.I.
	6-2-39	B. S. Guha, M.A., A.M., PH.D., F.N.I.
45	5-2-40	U. N. Ghoshal, M.A., PH.D.
	5-2-40	B. C. Law, M.A., B.L., PH.D., D.LITT., F.R.G.S.
	5-2-40	R. C. Majumdar, M.A., PH.D.
	5-2-40	H. S. Pruthi, M.Sc., PH.D., F.N.I.
	1-2-43	A. F. M. Abdul Ali, M.A., F.R.S.L., F.B.G.S., F.R.H.S.
	1-2-43	Sir J. C. Ghosh, KT., D.Sc., F.N.I.

HONORARY FELLOWS

	Date of Election.	
	4-2-20	A. FOUCHER, D.LITT. Boulevard Raspail 286, Paris, XVI ^e .
	4-2-20	SIR ARTHUR KEITH, M.D., F.R.C.S., LL.D., F.R.S.A. <i>Lately Hunterian Professor at the Royal College of Surgeons of England.</i> Buckston Browne Farm, Downe, Farnborough, Kent, England.
	4-2-20	R. D. OLDHAM, F.R.S., F.G.S., F.R.G.S. 1 Broomfield Road, Kew, Surrey, England.
	4-2-20	SIR DAVID PRAIN, KT., C.M.G., C.I.E., M.A., M.B., LL.D., F.R.S.E., F.R.S., F.L.S., F.Z.S., M.R.I.A., LT.-COL., I.M.S., <i>Formerly Superintendent, Royal Botanic Garden, Calcutta, and Director, Botanical Survey of India, and lately Director, Royal Botanic Gardens, Kew.</i> The Well Farm, Godstone Road, Whyteleafe, Surrey, England.
5	4-2-20	J. TAKAKUSU. Imperial University of Tokyo, Tokyo, Japan.
	2-3-21	F. W. THOMAS, C.I.E., M.A., PH.D., <i>Boden Professor of Sanskrit, University of Oxford.</i> 161 Woodstock Road, Oxford, England.
	7-6-22	SIR THOMAS HOLLAND, K.C.S.I., K.C.I.E., D.Sc., F.R.S. <i>Principal and Vice-Chancellor, University of Edinburgh.</i> Blackford Brae, Edinburgh.
	7-6-22	SIR LEONARD ROGERS, KT., C.I.E., M.D., B.S., F.R.C.P., F.R.S., I.M.S. 24 Cavendish Square, London, 4.
	7-1-25	STEN KONOW. Ethnographisk Museum, Oslo, Norway.
10	7-3-27	RT. HON'BLE THE EARL OF LYTTON, P.C., G.C.S.I., G.C.I.E. Knebworth, Herts, England.
	5-5-30	SIR ROBERT ROBINSON, D.Sc., F.R.S., <i>Waynflete Professor of Chemistry in the University of Oxford.</i> The Dyson Perrins Laboratory, South Parks Road, Oxford, England.

Date of Election.		
7-2-38	RT. HON'BLE SIR JOHN ANDERSON, P.C., 'G.C.B., G.C.I.E., <i>Lord Privy Seal.</i> 11 Cheapstow Vilas, London, S.W.	
4-9-39	SIR S. RADHAKRISHNAN, KT., M.A., D.LITT., F.B.A., <i>Vice-Chancellor, Benares Hindu University.</i> Benares.	
4-9-39	PROF. DR. HEINRICH LUEDERS, Germany.	
4-9-39	THE MOST HON'BLE THE MARQUESS OF ZETLAND, P.C., G.C.S.I., G.C.I.E., LL.D., D.LITT. Aske, Richmond, Yorkshire, England.	15
4-9-39	SIR JADUNATH SARKAR, KT., C.I.E., M.L.C., M.A., D.LITT. P.255 Lansdowne Road Extension, P.O. Rashbehari Avenue, Calcutta.	

CHANGES IN MEMBERSHIP

LOSS OF MEMBERS DURING 1943.

BY RETIREMENT.

Ordinary Members.

1. Hirde Narain. (1929.)
2. R. Ghosh. (1940.)

BY DEATH.

Ordinary Members.

1. Sir Bryce Burt. (1934.)
2. Sir Chhajuram Chowdhury. (1927.)
3. Sir Nilratan Sarkar. (1924.)
4. T. B. Jameson. (1926.)
5. P. N. Mullick. (1929.)
6. S. S. Huda. (1940.)
7. K. C. De. (1895.)

Ordinary Fellows.

1. G. de P. Cotter. (1929.)
2. Johan van Manen. (1918.)

Honorary Fellow.

1. Sir Aurel Stein. (1920.)

Special Anniversary Honorary Member.

1. Sir Sydney Burrard. (1934.)

Associate Member.

1. Rev. William Pettigrew. (1939.)

UNDER RULE 38.

1. P. K. Chakravarti. (1938.)
2. S. K. Haldar. (1930.)
3. R. A. Harayana. (1940.)
4. M. L. Mullick. (1934.)
5. M. R. Sahni. (1937.)

UNDER RULE 40.

1. M. C. Ghose. (1940.)
2. G. T. Labey. (1923.)
3. Sarabjit Singh. (1935.)
4. H. F. F. Williams. (1929.)

The names of the following Ordinary Members will be removed from the next member list under Rule 40 :—

1. A. G. Brocke. (1936.)
2. C. A. Boyle. (1932.)
3. J. H. Hutton. (1923.)

MEDALLISTS

ELLIOTT GOLD MEDAL AND CASH

RECIPIENTS.

- | | |
|------|--------------------------|
| 1893 | Chandra Kanta Basu. |
| 1895 | Yati Bhusana Bhaduri. |
| 1896 | Jnan Saran Chakravarti. |
| 1897 | Sarasi Lal Sarkar. |
| 1901 | Sarasi Lal Sarkar. |
| 1904 | { Sarasi Lal Sarkar. |
| | { Surendra Nath Maitra. |
| 1907 | Akshoy Kumar Mazumdar. |
| 1911 | { Jitendra Nath Rakshit. |
| | { Jatindra Mohan Datta. |
| | { Rasik Lal Datta. |
| 1913 | { Saradakanta Ganguly. |
| | { Nagendra Chandra Nag. |
| | { Nilratan Dhar. |
| 1918 | Bibhutibhushan Dutta. |
| 1919 | Jnanendra Chandra Ghosh. |
| 1922 | Abani Bhusan Datta. |
| 1923 | Bhailal M. Amin. |
| 1926 | Bidhu Bhusan Ray. |
| 1927 | Kalipada Biswas. |
| 1931 | T. C. N. Singh. |
| 1932 | P. N. Das-Gupta. |
| 1933 | Nirmal Kumar Sen. |
| 1934 | D. P. Roy Chowdhury. |
| 1935 | Kalipada Biswas. |
| 1937 | Pulin Behari Sarkar. |
| 1939 | P. K. Chatterjee. |
| 1941 | M. C. Nath. |

BARCLAY MEMORIAL MEDAL

RECIPIENTS.

- 1901 E. Ernest Green.
 1903 Sir Ronald Ross, KT., K.C.B., C.I.E., K.O.M.G., M.R.C.S., F.R.C.S.,
 D.P.H., LL.D., D.S.C., M.D., F.R.S.
 1905 D. D. Cunningham, C.I.E., F.R.S.
 1907 A. W. Alcock, C.I.E., M.B., LL.D., F.R.S.
 1909 Sir David Prain, KT., C.I.E., C.M.G., M.A., M.B., LL.D., F.R.S.E.,
 F.L.S., F.Z.S., M.R.I.A., F.R.S.
 1911 Carl Diener.
 1913 William Glen Liston, C.I.E., M.D., D.P.H.
 1915 J. S. Gamble, C.I.E., M.A., F.R.S.
 1917 H. H. Godwin-Austen, F.R.S., F.Z.S., F.R.G.S.
 1919 N. Annandale, C.I.E., D.S.C., C.M.Z.S., F.L.S., F.R.S.
 1921 Sir Leonard Rogers, KT., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S.,
 F.R.S.
 1923 Sir Samuel Christophers, KT., C.I.E., O.B.E., F.R.S., M.B.
 1925 J. Stephenson, C.I.E., B.S.C., M.B., CH.B., F.R.S., F.R.C.S., F.R.S.E.
 1927 S. W. Kemp, B.A., D.S.C., F.R.S., F.R.A.S.B.
 1929 Sir Albert Howard, KT., C.I.E., M.A.
 1931 R. B. Seymour Sewell, C.I.E., M.A., SC.D., M.R.C.S., L.R.C.P.,
 F.Z.S., F.L.S., F.R.A.S.B., F.R.S.
 1933 R. Row, O.B.E., D.S.C.
 1935 B. Sahni, M.A., SC.D., D.S.C., F.G.S., F.R.S., F.R.A.S.B.
 1937 Sir R. N. Chopra, KT. C.I.E., M.A., M.D., F.R.A.S.B.
 1939 Sir R. McCarrison, KT., C.I.E., M.D., D.S.C., F.R.C.P., LL.D., K.H.P.
 1941 Sir David Prain, KT., C.M.G., C.I.E., M.A., M.B., LL.D., F.R.S.E.,
 F.R.S., F.L.S., F.Z.S., M.R.I.A.

SIR WILLIAM JONES MEMORIAL MEDAL

RECIPIENTS.

- 1927 Sir Malcolm Watson, KT., LL.D., M.D., C.M., D.P.H.
 1928 Sir George A. Grierson, K.C.I.E., O.M., PH.D., D.LITT., LL.D., F.B.A.
 1930 Felix H. D'Herelle.
 1932 C. Snouck Hurgronje.
 1934 Rai Sir Upendra Nath Brahmachari, Bahadur, KT., M.A., M.D.,
 PH.D., F.S.M.F., F.R.A.S.B.
 1937 A. J. Wensinck.
 1940 Sir Prafulla Chandra Ray, KT., C.I.E., D.S.C., F.R.A.S.B., F.N.I.

ANNANDALE MEMORIAL MEDAL

RECIPIENTS.

- 1927 Fritz Sarasin.
 1930 Charles Gabriel Seligman, M.D., F.R.C.P., F.R.S.
 1933 Eugène Dubois.
 1936 John Henry Hutton, C.I.E., M.A., D.S.C., F.R.A.S.B.
 1939 Frank Weidenreich.
 1942 B. S. Guha, M.A., A.M., PH.D., F.N.I., F.R.A.S.B.

JOY GOBIND LAW MEMORIAL MEDAL

RECIPIENTS.

- 1929 Max Weber.
1932 Ernst J. O. Hartert, PH.D.
1935 Leo Semenowitch Berg.
1938 Baini Prashad, O.B.E., D.SC., F.Z.S., F.R.S.E., F.R.A.S.B.
1941 K. N. Bahl, D.SC., D.PHIL., F.N.I., F.R.A.S.B.
-

PAUL JOHANNES BRÜHL MEMORIAL MEDAL

RECIPIENTS.

- 1931 Rev. Ethelbert Blatter, S.J.
1934 Isaac Henry Burkill, M.A.
1938 Sir David Prain, KT., F.R.S.
1942 R.B. G. N. Rangaswami Ayyangar, F.N.I.
-

INDIAN SCIENCE CONGRESS MEDAL, CALCUTTA

RECIPIENTS.

- 1935 Meghnad Saha, D.SC., F.R.S., F.R.A.S.B.
1938 Sir James H. Jeans, D.SC., SC.D., LL.D., F.I.C., F.R.S.
-

PROCEEDINGS OF THE ORDINARY MONTHLY MEETINGS, 1943.

JANUARY

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 4th, at 5 P.M.

PRESENT

C. S. Fox, Esq., D.Sc., M.I.M.E., F.G.S., F.N.I., F.R.A.S.B.,
President, in the Chair.

Members :

Brown, Mr. Percy
Chatterjee, Mr. Patitpabon
Chatterji, Mr. D. C.
Chatterji, Dr. S. K.
Edgley, The Hon'ble Mr. Justice
N. G. A.
Fawcus, Mr. L. R.

Haq, Khan Sahib M. M.
Hendrie, Major J. H.
Hobbs, Mr. H.
Hora, Dr. S. L.
Majumdar, Dr. R. C.
Nag, Dr. Kalidas
and others.

Visitors :

Saraswati, Mr. S. K.

Sen, Mr. A. C.
Venkataram, Mr. N. S.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of the following four presentations of books, which had been kept on the table for inspection:—

1. From the Authoress: Joy of the Sun by Mrs. Savitri Devi, Calcutta, 1942.
2. From the Authors: Handbook of Shellac Analysis by Mr. H. K. Sen and Rangaswami, Namkum, 1942.
3. From the Author: Sharh-i-Risala-i-Qushairiya by S. Ata Husain, Hyderabad, 1361 A.H.
4. From Bhattacharya & Co., Calcutta: Sarvottasatantantram of Sarvanandanatha, Comilla, 1941.

The General Secretary announced that the following candidates would be balloted for as Ordinary Members:—

(1) *Millar, Guy Denny Lawrence*, F.R.G.S., F.I.S.A., Manager, The Kachariguon Tea Co., Ltd., P.O. Borjuli, Assam.

Proposer: K. Nag.

Seconder: J. N. Banerjee.

(2) *Sadeque, Abdus*, M.A. (Econ.), Professor of Economics, Islamia College; 177-B Park Street, Calcutta.

Proposer: K. N. Bagchi.

Seconder: K. Nag.

(3) *Abdul Hai, Hafiz Muhammad*, M.A., Professor in Arabic and Persian, Presidency College; 42-A Beniapukur Road, 2nd Floor, Block D, Calcutta.

Proposer: J. C. De.

Secunder: J. N. Banerjee.

(4) *Sen-Gupta, Jogendra Nath*, M.B. (Cal.), Oaklodge, Darjeeling.

Proposer: A. E. R. Bruce.

Secunder: Mrs. Anne Aucott.

(5) *Morton, Sir George B.*, Kt., O.B.E., M.C., Messrs. Bird & Co., Ltd., Chartered Bank Buildings, Clive Street, Calcutta.

Proposer: Percy Brown.

Secunder: N. G. A. Edgley.

(6) *Ramabhadran, N.*, B.A., Special Branch Sub-Inspector of Police, Brindavan, Kodaikanal, Dt. Madura.

Proposer: K. Nag.

Secunder: J. N. Banerjee.

The General Secretary reported that there had been no loss of membership since the previous meeting, by death.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The General Secretary reported that the election of

(1) K. L. Giare (elected on 5-6-1942), and

(2) A. A. A. Sabir (elected on 5-6-1942)

had become null and void, under Rule 9.

The General Secretary reported that there had been no withdrawals of application since the previous meeting.

In accordance with Rules 2c and 13, the Chairman called for a ballot for the election as an Associate member of the Society for a period of 5 years of Mr. W. S. Birney, whose name had been proposed at the last Ordinary Monthly Meeting.

The following exhibits were shown and commented upon:—

1. PERCY BROWN.—*A portable Shrine, with a gilt metal Figure.*

This is a small but very complete portable shrine containing a gilt metal figure, probably representing the Green Tārā, or the apotheosised form of the Nepalese princess Bhrikuti, who was instrumental in bringing Buddhism to Tibet in seventh century A.D. There is a padded silk aureole at the back of the figure serving as a cushion when the shrine is being carried.

2. THE GENERAL SECRETARY, R.A.S.B.

(a) 13 Koch and Tipperah silver Coins.

(i) *Coin of Naranārāyaṇa of Cooch Behar (Silver).*

Naranārāyaṇa flourished in the sixteenth century A.D. and wielded great influence in Northern Bengal and some parts of Assam. The present coin comes from Assam and is dated in 1477 Saka era, corresponding to 1555 A.D. The obverse bears the name of the King in early Bengali script while the reverse describes him as a great devotee of the God Siva.

(ii-vii) *Coins of Vijayanārāyaṇa of Tipperah.*

This King flourished also in the fifteenth century A.D. and, if we are to believe in the files of the Tipperah Raj, carried on extensive conquests in the north, east and west. It is dated in 1481 Saka era, corresponding to 1559 A.D. The obverse bears the name of the King in early Bengali script and on the reverse he is described as a devotee of Hara and Gauri.

(viii-xiii) *Spurious Coins of Vijayanārāyaṇa of Tipperah.*

These are the imitations of the above coins where the legends have been reversed on account of the fact that, by mistake, the dies have been prepared with the legends in positive.

(b) *Certain valuable scientific Papers and Books by past and present Members of the Royal Asiatic Society of Bengal:—*

- (i) Memoirs of the life, writings and correspondence of Sir William Jones by Lord Teignmouth.
- (ii) Scientific papers by James Prinsep published in various volumes of the Journal and Asiatic Researches of the Society.
- (iii) Mineralogical papers by H. T. Prinsep published in the Journal of the Society.
- (iv) Sketches of the Solar System in Bengali by Raja Kalikrishna Deva.
- (v) Astronomical papers by Prof. P. C. Sen Gupta published in the Journal of the Society.

3. THE DIRECTOR, GEOLOGICAL SURVEY OF INDIA :
Specimens of Economic minerals, Ores, etc.

The Chairman announced the result of the ballot for the election of Ordinary Members and the Associate Member and declared that the candidates had been duly elected.

The Chairman announced that the next Discussion meeting would be held on Thursday, the 7th January, when Dr. S. K. Chatterji would open a discussion on 'Indian Languages'.

The Chairman also announced that the Annual Meeting of the Society would be held as usual on the first Monday in February and invited the members present to communicate to the office names and addresses of non-members to whom they wished invitations to be issued.



FEBRUARY

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held immediately after the termination of the Annual Meeting on Monday, the 1st, for the election of Ordinary Members and the transaction of routine business.

PRESENT

DR. SYAMAPRASAD MOOKERJEE, M.A., B.L., LL.D., D.LITT.,
President, in the Chair.

Members :

Agharkar, Dr. S. P.
Alimuddin, Mr. M. S.
Asadullah, K. B. K.M.
Auden, Mr. J. B.
Bagchi, Dr. K. N.
Banerjee, Dr. J. N.
Bastin, Mr. R. W.
Biswas, Dr. K. P.
Bose, Mr. M. M.
Brown, Mr. Percy
Chatterjee, Mr. B. C.
Chatterjee, Mr. K. N.
Chatterjee, Dr. M. M.
Chatterjee, Mr. P. P.
Chatterjee, Dr. S. K.
Edgley, The Hon'ble Mr. Justice
N. G. A.
Fawcus, Mr. L. R.
Fox, Dr. C. S.
Gangoly, Mr. O. C.

Ghosh, Dr. P. N.
Griffiths, Dr. W. G.
Guha, Dr. B. S.
Haq, K. B. M.M.
Hendrie, Major J. H.
Ishaque, Dr. M.
Law, Dr. B. C.
Law, Dr. S. C.
Lort-Williams, Sir John
Majumdar, Dr. R. C.
Meyer, Miss S.
Mookerjee, Mr. R. P.
Mukherjee, Dr. J. N.
Nag, Dr. Kalidas
Rahman, Sh. K.
Ray-Chaudhuri, Dr. H. C.
Sarkar, Sir J. N.
Siddiqi, Dr. M. Z.
Waight, Mr. H. G.
West, Mr. W. D.

The minutes of the last meeting were read and confirmed.

The General Secretary reported that the presentations of books received during the last month would be exhibited at the next meeting.

The General Secretary announced that the following candidates would be balloted for as Ordinary Members:—

(7) *Bhattacharjee, Mrs. Serapia*, Artist-Author, 20 Dum Dum Road P.O. Ghughudanga, Calcutta.

Proposer: Kalidas Nag.

Seconder: J. C. De.

(8) *Mukherjee, S. K.*, M.Sc., Ph.D. (Edn.), Curator of the Herbarium, Royal Botanic Garden, Calcutta.

Proposer: Kalipada Biswas.

Seconder: Kalidas Nag.

(9) *Sen, Nepal Chandra*, Rai Bahadur, Director of Land Surveys, Bengal; 35 Gopalnagar Road, Alipur, Calcutta.

Proposer: R. W. Bastin.

Seconder: L. R. Fawcus.

(10) *Habibullah, A.B.M.*, M.A. (Cal.), Ph.D. (Lond.), Dip.Lib. (Lond.), Lecturer, Department of History and Islamic History and Culture, Calcutta University; 11 Bondel Road, Ballygunge, Calcutta.

Proposer: J. N. Banerjee.

Seconder: Kalidas Nag.

The General Secretary reported the following loss of membership, since the previous meeting, by death:

(1) Dr. G. de P. Cotter (An Ordinary Member, 1929. Fellow, 1930).

The General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The General Secretary reported that there had been no lapses of election under Rule 9 and no withdrawals of application, since the previous meeting.

The President announced the result of the ballot for the election of Ordinary Members and declared that the candidates had been duly elected.

The President announced that the next Discussion meeting would be held on Thursday, the 4th February, when Dr. B. S. Guha would open a discussion on 'Races and Cultures of India'.



MARCH

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 1st, at 5 P.M.

PRESENT

DR. S. P. MOOKERJEE, M.A., B.L., LL.D., D.LITT., President, in the Chair.

Members :

Agharkar, Dr. S. P.
 Bent, Mr. W. A.
 Biswas, Dr. K. P.
 Brown, Mr. Percy
 Chatterjee, Mr. B. C.
 Edgley, The Hon. Mr. Justice
 N. G. A.
 Fawcus, Mr. L. R.

Gangoly, Mr. C. C.
 Griffiths, Dr. W. G.
 Hawes, Mr. R. M.
 Hendrie, Mr. J. H.
 Hobbs, Major H.
 Kramrisch, Dr. S.
 Majumdar, Dr. R. C.
 Sen, Mr. N. C.

Visitors :

Reynolds, Mr. N. S.

Warner, Capt. E. T. H.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of the following 18 presentations of books which had been placed on the table for inspection:—

1. From the Author: Introduction to Vedanta Manjusa and Indian Monism by N. C. Vedantatirtha, Calcutta, 1938.
2. From the Indian Science Congress Association: Proceedings of the 28th Session, Calcutta, 1942.
3. From Director, Archaeological Researches in Mysore: Annual Report of the Mysore Archaeological Department for 1941, Mysore, 1942.
4. From Govt. of India: Panchalas and their Capital Ahichchatra (Memoirs, Arch. Sur. of India No. 67) by B. C. Law, Delhi, 1942.
5. From the Trustees: Annual Report of the Prince of Wales Museum of Western India for 1941-42, Bombay, 1942.
6. From the Govt. of India: Annual Report on S. Indian Epigraphy for the year ending 31-3-1938, Calcutta, 1942.
7. From Sh. M. Ashraf: Geographical Factors in Arabian Life and History by Sh. Inayatullah, Lahore, 1942.
8. From the Author: Sanskrit Poetesses by J. B. Chaudhuri, Vol. II, pt. A, Calcutta, 1941.
9. From the Author: Art and Archaeology Abroad by Kalidas Nag, Calcutta, 1937.
- 10-11. From Smithsonian Institution: Origin of the Far Eastern Civilization by C. W. Bishop; Evolution of Nations by J. R. Swanton, Washington, 1942.
12. From the Author: Early Sculpture of Bengal by Sarasi Kumar Saraswati, Calcutta, 1937.
13. From the Author: Le makara dans la Sculpture de l'Inde by J. Ph. Vogel, Paris, 1930.
14. From the Author: Bombay Naufragia by T. W. Venn.
15. From Folk-lore Society: British Calendar Customs, Scotland by M. M. Banks, London, 1941, Vol. III.
16. From N. C. Vedantatirtha: Aksapada Gotama, Calcutta, 1336 B.S.
17. From R.A.S.B.: Descriptive Catalogue of the Vernacular MSS. in R.A.S.B., ed. by J. N. Gupta, Calcutta, 1941.
18. From the Editor: Abhijnana Sakuntala, ed. by K. P. Vidyaratna, Calcutta, 1932.

The General Secretary reported that the following candidates would be balloted for as Ordinary Members:—

(11) *Ray, Nihar-Ranjan*, M.A., D.Litt. & Phil. (Leiden), Dip. Lib. (London), F.L.A., University Librarian and Post-Graduate Lecturer; Central Library, The University, Calcutta.

Proposer: Suniti Kumar Chatterji.

Seconder: Kalidas Nag.

(12) *Ray, Kanakendra Mohan*, B.A. (Cal.), Assistant Inspector, Jute Regulation, P.O. Kamalesagar, Tipperah.

Proposer: Suniti Kumar Chatterji.

Seconder: Kalidas Nag.

(13) *Rahman, A. F. M. Khalil-ur*, B.A. (Lond.), Ph.D. (Lond.), Professor of History, Presidency College; 103 Ballygunge Place, Calcutta.

Proposer: M. M. Haq.

Seconder: S. K. Rahman.

(14) *Sen, Anil Kumar*, M.B. (Cal.), Director of Laboratories of Biological Research and Experimental Therapy, B.C.P.W.; 75 Ballygunge Place, Calcutta.

Proposer: K. N. Bagchi.

Seconder: Suniti Kumar Chatterji.

(15) *Singh, B. N.*, D.Sc., F.N.I., F.A.Sc., Irwin Professor of Agriculture University Professor of Plant Physiology and Head of the Institute of Agricultural Research, Benares Hindu University, Benares.

Proposer: Suniti Kumar Chatterji.

Seconder: Kalidas Nag.

The General Secretary reported that there had been no loss of membership since the previous meeting by death or resignation.

The General Secretary reported that there had been no lapses of election under Rule 9 or withdrawals of application, since the previous meeting.

The General Secretary reported that the constitution of the Standing Committees of the Society to be as follows:—

Finance: President, General Secretary, Honorary Treasurer (*ex-officio*), Sir John Lort-Williams, The Hon'ble Mr. Justice N. G. A. Edgley, Dr. S. L. Hora and Mr. Percy Brown.

Library: President, General Secretary, Hony. Treasurer, Phil. Secretary, Jt. Philological Secretary, Natural History Secretary (Biology), Natural History Secretary (Physical Science), Anthropological Secretary, Historical and Archaeological Secretary, Medical Secretary, Library Secretary (*ex-officio*), Sir John Lort-Williams, K. B. K. M. Asadullah.

Publication: President, General Secretary, Hony. Treasurer, Phil. Secretary, Jt. Phil. Secretary, Natural History Secretary, (Biology), Natural History Secretary (Phys. Science), Anthropological Secretary, Historical and Archaeological Secretary, Medical Secretary, Library Secretary (*ex-officio*), Dr. S. K. Chatterji and Dr. B. C. Law.

Bibliotheca Indica: President, General Secretary, Hony. Treasurer (*ex-officio*), Dr. S. K. Chatterji, Philological Secretary, Jt. Phil. Secretary, Dr. B. C. Law, Sir Jadu Nath Sarkar and Dr. M. Ishaque.

Programme Committee: President, General Secretary, Hony. Treasurer (*ex-officio*), Sir John Lort-Williams, The Hon'ble Mr. Justice N. G. A. Edgley, Dr. K. N. Bagchi, Mr. L. R. Fawcus, Dr. W. G. Griffiths, Mr. Percy Brown, and Dr. R. C. Majumdar.

The following exhibits were shown and commented upon:—

1. PERCY BROWN.—*A replica to a reduced scale, in bronze, of the colossal Trimurti rock sculpture in the rock-cut temple on the Island of Elephanta, Bombay.*

2. THE GENERAL SECRETARY.—*An illustrated MS. from the Indian Museum collection in the Royal Asiatic Society of Bengal.*

Viveka Pañcāmṛta (i.m. No. 5864) written at the instance of prince (Nṛpa) Dalchand. It consists of an exposition in Hindi of the five sutras, viz. (1) Mahesvara sutra ; (2) Kapila (samkhya) sutra; (3) Patañjala (yoga) sutra ; (4) Brahma sutra, and (5) Bhakti sutra of Sandilya. The manuscript was copied in Samvat 1852 (1794 A.D.) and consists of six miniature illustrations in a style reminiscent of a mixture of late Mughal and Rajput schools.

The following communication was made :—

1. R. M. HAWES.—*Survival of immigrant Oraons in the Dooars as typical Communities.*

Summary : Favourable country; communal inclinations; facilities for settlement. Competition with indigenous Bengalis, conformity with industrial routine; acceptance of new outlook; tendency to caste equality. Advance of Western ideas; influence of Hinduism. Adaptation of customs, adjustment of regimen and its suitability; adherence to tradition; lack of enterprise.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that the candidates had been duly elected.

The Chairman also announced that the next Discussion meeting would be held on Thursday, the 4th March, at 5 P.M., when Sir Jadu Nath Sarkar, Kt., would open a discussion on 'The Indian Warfare in the eighteenth century'.



APRIL

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 5th, at 5-30 P.M.

PRESENT

DR. S. P. MOOKERJEE, M.A., B.L., LL.D., D.LITT., President, in the Chair.

Members :

Banerjee, Dr. J. N.
Bhattacharya, Mrs. S.
Chatterjee, Mr. B. C.
Chatterjee, Mr. P. P.
Das-Gupta, Mr. C. C.
Driver, Mr. D. C.

Edgley, The Hon'ble Mr. Justice
N. G. A.
Gangoly, Mr. O. C.
Hendrie, Major J. H.
Hobbs, Major Harry
Majumdar, Dr. R. C.

Nag, Dr. Kalidas.

Visitors :

Marshall, Capt. P. J.

Rock, Dr. J. F., Honolulu, T.H.

At the outset the Chairman announced the death of Mr. Johan van Manen, C.I.E., who was a Life Member (1918), an Ordinary Fellow (1927) and the General Secretary of the Society from 1923 to 1939.

The Chairman called upon the General Secretary to read an obituary notice of the late Mr. Van Manen, written by Mr. C. E. van Aken, Consul for the Netherlands, which was done.

After this Major Harry Hobbs spoke a few words about Mr. Van Manen, and also read another obituary notice prepared by Lt.-Col. N. Barwell.

On its conclusion a vote of condolence was passed, all present standing.

The minutes of the last meeting were then read and confirmed.

The General Secretary announced that the following two candidates would be balloted for as Ordinary Members:—

(16) *Sukul, L.*, Lecturer, Calcutta University: Kent House, Mission Row Extension, Calcutta.

Proposer: Kalidas Nag.

Seconder: N. Dutt.

(17) *Banerjee, Binayakanath*, M.A., B.L., Kavyatirtha, Advocate; 6/1 Williams Lane, Calcutta.

Proposer: N. K. Basu.

Seconder: N. G. A. Edgley.

The General Secretary announced receipt of twelve presentations of books, which had been placed on the table for inspection, as follows:—

1. From the Author: *Kamboja* by Swami Sadananda, Lucknow, 1943.

2. From the Author: *Indore Museum* by D. B. Diskalkar, Indore, 1942.

3. From the Author: *Pre-Vedic Times to Vijayanagara* by H. D. Sankalia, Poona, 1942.

4. From Annamalai University: *Nayaka of Tanjore* by V. Vridhagirisan, Annamalai, 1942.

5. From Govt. of India: *Kannada Inscriptions from the Madras Presidency* by R. Shama Shastri, Madras, 1941.

6. From Bh. Or. Res. Inst.: *Mahabharata Aranyaka of Vasudeva*, ed. by V. S. Sukthankar, Poona, 1942.

7-9. From the Editor: *Gilgit Manuscripts*, ed. by N. Dutt, Vols. I, II and III, Srinagar, 1939, 1941 and 1942.

10. From R.A.S.B.: *Vaikhyanasasrautasutram*, ed. by W. Caland, Bib. Ind. Work No. 265, Calcutta, 1941.

11. From Govt. of Madras: *Triennial Catalogue of MSS. during 1922-28*, Govt. Or. MS. Library, Madras, Vol. V, Telugu, ed. by P. P. S. Sastri and A. Sankaran, Madras, 1942.

12. From Calcutta University: *Haramani* by Mm. Mansur-Uddin, Calcutta, 1943.

The General Secretary reported the following loss of membership, since the previous meeting by resignation:—

1. Hirde Narain (An Ordinary Member, 1920).

The General Secretary reported that there had been no lapses of election under Rule 9 and no withdrawals of application since the previous meeting.

In accordance with Rule 48 (d), the General Secretary submitted for confirmation by the meeting the final report of the Sub-Committee appointed by the Council in November, 1942, containing certain salaried appointments, which was accepted with certain modifications by the Council at their meetings on 16-2-1943 and 16-3-1943.

FINAL REPORT OF THE SUB-COMMITTEE.

During the last two months we have had a full opportunity of enquiring into the working of the system of administration recommended by the Special Enquiry Committee and the other matters referred to us and we have had the advantage of Dr. Nag's co-operation and advice. We are satisfied that the state of slackness and confusion, inadequacy and inefficiency to which we referred in our preliminary report was not due to any fundamental defects in the system recommended and adopted for the Library, the staff and the administration generally, but to factors, some temporary and some of longer standing, which have impeded seriously the successful working of the system. Those factors are:—

- (1) Disorganization, confusion, and partial suspension of work as a result of A.R.P. measures taken to safeguard our possessions.
- (2) Lack of regular and adequate supervision and continuity of policy owing to upset caused by transfers of personnel among Government servants.
- (3) General slackness, indiscipline, lack of co-ordination and inattention to work of the staff, partly due to war scares.
- (4) Inefficiency, unsuitability, and lack of necessary cultural equipment of certain members of the staff, particularly in the Library.

(1) These (A.R.P.) measures have now been completed. Partly due to inconsistent orders, of the 32,000 odd volumes of books, etc. ten months were spent by the old staff of the Library in removing some 20,000 to the ground floor, whereas the balance of 12,000 has been removed, under Dr. Nag's direction, in the single month of January, 1943.

(2) This condition has been remedied by the appointment of Dr. Nag as General Secretary, upon the terms recommended in our preliminary report.

(3) General slackness and indiscipline, etc. of many members of the staff, both clerical and menial, had gradually reached very serious proportions. Henceforth a register should be kept by the Superintendent of the time kept by every member of the staff and the Rules about late attendance, etc. strictly enforced by the General Secretary. The authority of the Superintendent should be strengthened—call complaints, etc. should be made to him and brought by him to the notice of the General Secretary. Any approach by any member of the staff to individual members of the Council should be considered a ground for dismissal.

(3-4). Our task has been simplified to some extent by—(a) The resignation of Mr. De. (b) The resignation of Mr. Das. (c) The dismissal of the temporary Filing Clerk whose services were no longer necessary. (d) The headlong flight without notice of all but four of the menial staff after the air-raid on 24-12-1942. These were the men upon whom we had sought to rely for A.R.P. measures. Their work and discipline had been unsatisfactory for some considerable time and they were dismissed summarily. A smaller number of menials, including cycle peons, on slightly higher pay, have been appointed in their place.

Book Library.

A modified version of the 'Dewey' system of cataloguing, etc. was adopted upon the recommendation of the Special Enquiry Committee, after very careful consideration of experienced advice. We are of opinion that it is fully adequate and eminently suitable for the peculiar needs of our Library. The necessary special registers and equipment were purchased, at a cost of Rs.711, so far back as August, 1941. We find that during the seventeen intervening months very little work has been done on the Authors Catalogue, less on the Subjects Catalogue and some of the Registers have not even been touched. For many months nothing has been done at all. In such a lamentable state of affairs and in face of such gross slackness, confusion, ignorance and lack of necessary experience of those responsible, we are not surprised at the report of the Library Sub-Committee. But the defects are not in the system adopted, but in the omission to work it.

We estimate that with a proper staff and ordinary application the Authors Catalogue from 1934 to date can be completed within three months, and the Subjects Catalogue for the same period within another three months.

Dr. Nag has transferred to the Library Raye, who in the past had had considerable experience of work in our Library, and intends to transfer Gupta, also, who is able to type. In addition, we recommend that Mr. B. C. Bose, M.A., who has been appointed provisionally, be appointed permanently as Library Assistant upon the grade of Rs.75—5—125. We recommend also that Mr. N. Gupta, who has been about 19 years in our service upon the lower grade of Rs.50—3—80, plus a personal allowance of Rs.10 recommended by the Special Enquiry Committee, be raised to the grade of Rs.75—5—125 with a commencing salary of Rs.100.

MSS. Library.

The neglect of our priceless collection of MSS. for many years past amounts almost to a disgrace. Since the death of Dr. H. P. Sastri their cataloguing has been talked about for a long time, but very little has been done and, in our opinion, much money has been wasted. We find that two part-time Editors alone succeeded in absorbing Rs.25,000. We undertook, over six years ago, to prepare, within two years, a catalogue of 11,000 MSS. from the Indian Museum, entrusted to us by Government and the work has not yet been touched. We consider that these heavy tasks should be undertaken forthwith and actively and unceasingly pursued by culturally qualified students tackling particular collection and being remunerated, upon a specific project basis, out of the Oriental Publication Funds until the whole work has been completed. We cannot afford to get all this necessary work done quickly without some voluntary help and we recommend that efforts be made to enlist promising young scholars who are interested in this kind of work, and, in addition, that Mr. S. K. Saraswati, M.A., who has been appointed as Library Assistant provisionally upon a part-time basis of 3 hours daily at a salary of Rs.100 per month be retained upon the same terms for the time being. The question of his permanent employment may be considered after six months' experience has been gained. His salary should be debited to the Oriental Publications Fund No. 1.

Audit and Valuation, Press, Publications, Stock.

The insurance of our possessions is in a most unsatisfactory and muddled condition, mainly owing to the fact that we have only the vaguest idea about their value. A proper valuation, so far as possible, should be commenced immediately and a new Policy taken out to cover

accurately specified properties and complete inventories should be made of all our assets. A thorough overhaul of *stock* is necessary and accurate statements prepared showing which of our publications have been completed. The *Press and Publication* side of our activities has been neglected and has suffered on account of slackness, lack of interest, unsuitability and lack of necessary equipment of the staff employed. We require constant information and advice about the business part of our undertaking and guidance about which publications are most in demand, so as to avoid blocking too much capital in slow-selling publications. For all these purposes we recommend the provisional appointment of Mr. D. Burman, M.Com., on a part-time basis of 3 hours daily and a salary of Rs.100 per month to date from the 1st of February, 1943. His permanent appointment may be considered later.

It will be observed that our recommendations are mainly tentative and experimental and their success will depend upon constant supervision, trial, consultation and report. In conclusion therefore we recommend that this Sub-Committee be re-appointed, to assist the General Secretary, make interim reports if necessary, and, after six months trial, review the situation generally, report to the Council on the results of the measures taken, and advise about the future.

Consideration of Final Report of the Sub-Committee appointed by the Council on 2-11-1942. Order: Accept the majority report with the following modifications. Mr. Bose to remain provisionally appointed. Mr. Gupta granted provisionally a salary of Rs.100 irrespective of grade with effect from 1st February, 1943. Mr. Burman to be appointed for five months on Rs.100 per month from 1st February, 1943. Mr. Pramili Bose, Assistant Librarian, Calcutta University, is appointed to assist in the organization of the Library on an honorarium of Rs.300. The Sub-Committee need not be re-appointed. Council No. 10 of 16-2-1943.

Order: Confirm.

The following paper was read:—

1. C. C. DAS-GUPTA.—*Some Terracottas from Mathura preserved in the Francis Hopp Museum of Asiatic Arts.*

In this paper, the author has given an account of twenty-eight so far unpublished specimens of terracottas, reported to have been found at Mathura, which are now preserved in the Francis Hopp Museum of Asiatic Arts at Budapest in Hungary. On considerations of stylistic evolution and analogy with those specimens of terracottas whose ages have been established, the author thinks that these may be ascribed to the post-Indus Valley, pre-Maurya, Maurya, Sunga, Kushana and Gupta periods. The religious and secular characteristics of these specimens have been dealt with and the stages of evolution which they have gone through are also indicated.

The Chairman then called upon the General Secretary to show and explain the exhibit of *Select coins from the collection of the Royal Asiatic Society of Bengal.*

The Chairman announced the result of the ballot for the election of the Ordinary Members and declared that both the candidates had been duly elected.



MAY

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 3rd, at 5-30 P.M.

PRESENT

DR. R. C. MAJUMDAR, M.A., PH.D., Historical and Archaeological Secretary, was in the Chair.

Members :

Bagchi, Dr. K. N.	Ghose, Mr. R. C.
Bhattacharjee, Mrs. S.	Habibullah, Mr. A. B. M.
Chatterjee, Mr. B. C.	Hendrie, Major J. H.
Chattopadhyay, Mr. K. P.	Hobbs, Major Harry
Culshaw, Rev. W. J.	Hora, Dr. S. L.
Driver, Mr. D. C.	Malik, Khan Bahadur A. R.
Edgley, The Hon'ble Mr. Justice N. G. A.	Nag, Dr. Kalidas.

Visitors :

Deb, Kumar H. K.

Sanyal, Dr. A. N.

The minutes of the last meeting were read and confirmed.

The General Secretary announced that the following candidates would be balloted for as Ordinary Members:—

(18) *Aken, C. E. van*, Consul of the Netherlands, 27 Dalhousie Square, Calcutta.

Proposer: Mr. Justice N. G. A. Edgley.

Seconder: K. Nag.

(19) *Khaitan, Kali Prasad*, Barrister-at-Law, 6 South End Park, P.O. Rashbehari Avenue, Calcutta.

Proposer: K. Nag.

Seconder: R. C. Ghose.

(20) *Khundkar, The Hon'ble Mr. Justice N. A.*, Barrister-at-Law, High Court, Calcutta.

Proposer: Mr. Justice N. G. A. Edgley.

Seconder: Percy Brown.

(21) *Crofton, Morgan George*, Captain, Indian Army; c/o Messrs. Lloyds Bank, Clive Street, Calcutta.

Proposer: Mr. Justice N. G. A. Edgley.

Seconder: K. Nag.

(22) *Chokhany, Ram Dev*, Rai Bahadur, 27 Baranashi Ghose Street, Calcutta.

Proposer: Mr. Justice N. G. A. Edgley.

Seconder: K. Nag.

(23) *Sen, Karunaketan*, I.C.S., Special Officer, Directorate of Civil Supplies of Bengal; 5-A Heysham Road, Elgin Road, Calcutta.

Proposer: K. Nag.

Seconder: R. C. Majumdar.

(24) *Tyson, Geoffrey William*, C.I.E., Journalist, Managing Editor, *Capital*, 7 Church Lane, Calcutta.

Proposer: Sir John Lort-Williams.

Seconder: K. Nag.

(25) *Rajgarhia, Chand Mull*, Mining Engineer, Giridih, E.I. Ry.

Proposer: Cyril S. Fox.

Seconder: W. D. West.

(26) *Mullan, C. S.*, C.I.E., M.A., I.C.S., Commissioner of Income Tax, Bengal; U.S. Club, Calcutta.

Proposer: Mr. Justice N. G. A. Edgley

Seconder: K. Nag.

(27) *Chatterjee, Paresh Chandra*, Merchant, 6 Mission Row, Calcutta.

Proposer: K. Nag.

Seconder: R. C. Majumdar.

(28) *Sanyal, Probodh Chandra*, B.A., Nabadwip, Bengal.

Proposer: K. Nag.

Seconder: R. C. Majumdar.

The General Secretary reported receipt of 13 presentations of books, which had been kept on the table for inspection:—

1. From the Author: *This thy Body* by Mrs. C. Chesterton, London.
2. From the Author: *Hindu Realism* by J. C. Chatterjee, Allahabad, 1912.
3. From University of Madras: *Critical Studies on Katyayana's Suklayajurvedapratishakhyā* by M. V. V. Sarma, Madras, 1935.
4. From the Author: *Oriental Treasures* by J. C. Katrak, Bombay, 1941.
5. From Smithsonian Institution: *Natural History Background of Camouflage* by H. Friedman, Washington, 1942.
6. From Govt. of Bengal: *Press-list of ancient Documents re. Governor-General in Bengal in Council, etc.*, Rev. Dept., Vol. X, Calcutta, 1942.
7. From Dist. Lab. Assn.: *Handbook of Castes and Tribes employed in Tea Estates in N.E. India*, Calcutta, 1924.
8. From the Author: *Twenty Portraits* by Mukul Dey, Calcutta, 1943.
9. From the Author: *Report of the Game and Game Fishes Preservation Com., etc.*, Bengal, by L. R. Fawcett, Calcutta, 1943.
10. From Smithsonian Institution: *Peoples of the Philippines* by H. W. Krieger, Washington, 1942.
11. From the Author: *Peshwa Madhav Rao I* by A. C. Banerjee, Calcutta, 1943.
- 12-13. From Hakluyt Society: *Europeans in West Africa, 1450-1560*, Vols. I and II, by J. W. Blake, London, 1942.

The General Secretary reported the following loss of membership, since the previous meeting by death.—

(3) Sir Bryce Burt (An Ordinary Member, 1934).

(4) Sir Chhajuram Chowdhury (A Life Member, 1927).

The General Secretary reported that there had been no loss of membership since the previous meeting by resignation.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

In accordance with Rule 45, the General Secretary reported that the Council submit for confirmation to the meeting the following changes in the constitution of the Council, made at the Council meeting held since the last Ordinary Monthly Meeting:—

Dr. R. C. Majumdar, Historical and Archaeological Secretary, to be Library Secretary in addition to his own duties, vice Dr. S. L. Hora, who will remain a member of Council.

Order : Confirm.

The following papers were read:—

1. K. P. CHATTOPADHYAY.—*Korku funeral Customs and memorial Posts.*

The funeral customs of Korkus and the Sedoli rites have been described by Hiralal and Russell, and other writers. A photograph of memorial tablets has been published by Major Gordon. No photograph of the Memorial posts nor any description of the chambered variety of Mundas has so far been published.

In this paper, the author describes in detail the Sedoli ceremonial and notes the points of resemblance with the Santal and Oraon bone disposal rites. He has also noted details of the solid type Munda and of the chambered variety, observed by him. Photographs of the different types and of a Bengal *brsakastha*, which is a similar memorial post, are also given in it.

2. HARIT KRISHNA DEB.—*Mathura Lion-Capital Inscriptions.*

The remarkable lion-capital, covered with Kharoshthi inscriptions, found at Mathura by the late Pundit Bhagwanlal Indraji and bequeathed by him to the British Museum, has from time to time been made a subject for discussion by Indologists who have expressed divergent opinions on the readings and interpretations given hitherto by scholars.

In this paper, the author has made an attempt to give his own readings and interpretations in the light of latest historical data, after carefully studying the plastercast of the Capital in the Indian Museum, at Calcutta.

The Chairman then called upon the General Secretary to show and explain the exhibit of Mr. L. R. Fawcus of *Flint Implements from Syria*.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that all candidates had been duly elected.



JUNE

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 7th, at 5-30 P.M.

PRESENT

DR. M. Z. SIDDIQI, M.A., PH.D., Joint Philological Secretary (in the Chair).

Members :

Alimuddin, Mr. M. S.	Gangoly, Mr. O. C.
Bastin, Mr. R. W.	Ghose, Mr. R. C.
Bhattacharjee, Mrs. S.	Habibullah, Dr. A. B. M.
Chatterjee, Mr. P. P.	Hendrie, Major J. H.
Das-Gupta, Prof. C. C.	Majumdar, Dr. R. C.
Driver, Mr. D. C.	Nag, Dr. K.
Edgley, The Hon'ble Mr. Justice N. G. A.	Ray Chaudhuri, Dr. H. C.

Visitors :

Ahmed, Mr. S.	Ray-Chaudhuri, Mr. G. C.
Bose, Mr. S. C.	Ray, S. N.
Chatterjee, Mr. S. C.	Sarkar, Dr.
Mitra, Mr. T.	Sen, Mr. A. B.

Sen, Mr. M. U.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of nine presentations of books, which had been kept on the table for inspection. They are:—

1. From Andhra University: Advanced History of India (Hindu Period) by P. T. S. Iyengar, Madras, 1942.
- 2-4. From the Author: Tibetan Word Book; Tibetan Syllables; Tibetan Sentences by Sir Basil Gould, Oxford, 1943.
5. From the Author: Ramayana in Stone by Swami Sadananda, Calcutta, 1943.
6. From E. B. H. Baker: Practical Hand-book of Kachin or Ching-paw Language by H. F. Hertz, Calcutta, 1943.
7. From Nizam Govt.: Annual Reports of the Arch. Dept. of H.E.H. the Nizam, Hyderabad, 1942.
8. From the Indian Science Congress Association: Proceedings of the 29th Session, Calcutta, 1943.
9. From Oxford University Press: Languages and Linguistic Problem (pamphlet) by S. K. Chatterji, Calcutta, 1943.

The General Secretary announced that the following candidates would be balloted for as Ordinary Members:—

(29) *Hosain, Syed Mozaffar*, Head Assistant, Chief Garrison Engineer's Office, Ranchi, B.N.R.

Proposer: M. Z. Siddiqi.
Seconder: M. Ishaque.

(30) *Zakaria, A. K. M.*, Fellow, Calcutta University; 68 Syed Amir Ali Avenue, Ballygunge, Calcutta.

Proposer: M. Mahfuz-ul Haq.
Seconder: K. Nag.

(31) *Hasan, Zahur-ul*, M.A., PH.D., LL.B., Advocate, High Court, 'Gul Afshan', Moradabad, U.P.

Proposer: K. Nag.
Seconder: M. Ishaque.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The General Secretary reported that there had been no lapses of election under Rule 9 or withdrawals of application, since the previous meeting.

The General Secretary announced that, in accordance with Rule 48 (a) the Council have made the following addition to the 'Regulations regarding the Library':

That the word 'Coins' be added after the word 'Inscriptions' to the body of Regulation No. 19.

The General Secretary reported the following loss of membership since the previous meeting by death:

(5) Sir Nilratan Sircar (An Ordinary Member, 1924).

The Chairman called upon the General Secretary to read the obituary notice of the late Sir Nilratan Sircar, prepared by Dr. A. C. Ukil.

The Chairman then called upon the General Secretary to read the obituary notice of the late Sir Chhajuram Chowdhury, prepared by Dr. S. C. Law.

A vote of condolence was then passed, all present standing.

The following exhibits were shown and commented upon by Dr. R. C. Majumdar:—

(1-2) *Two copper-plate Grants of Sasanka.*

These grants were discovered, somewhere in Midnapore district, about six years ago, and a short account of them with photographs and a tentative reading of the text were published

by Mr. Manishi Nath Basu, B.L., in a local paper *Madhavi*, Ashadha, 1345 B.S. (pp. 3-6). They remained, however, unknown to most scholars till the exhibitor happened to see them in course of a recent visit to Midnapore (April 23, 1943) and brought them to Calcutta. Both of them record grants of land during the reign of Sasanka. One of these Grants was made by the *samanta* Somadatta who was the Governor of Dandabhukti to which administrative unit Utkaladesa was also attached. The second Grant was made by Mahapratihara Subhakirtti. Both the Grants were issued from the *adhikarana* of Tavira. Both the inscriptions contain dates but the numerical symbols used have not been met with before and the interpretation is, therefore, doubtful. The date of the record, when finally fixed, is likely to throw new light on the history of Sasanka.

(3) *A new Inscription, engraved on an Image of Ganesa.*

This new inscription has been recently discovered in the village of Narayanpur, in the Tipperah district. A paper-rubbing of the inscription was brought to Dr. D. C. Sircar on April, 25, 1943, and he has subsequently secured an inked estampage. The inscription records that the image was set up in the 4th regnal year of Maharajadhiraja Mahipaladeva, by the merchant Buddhamitra, an inhabitant of Vilikandhaka in Samatata.

The Chairman then called upon Dr. R. C. Majumdar to open a symposium on the early History of Bengal on the basis of recent researches and requested the members present to join in the Discussion.

The Discussion continued and members took part in it. As it was getting late, the Chairman announced that the symposium would be continued at the next Ordinary Monthly Meeting on 5th July.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that the candidates had been duly elected.



JULY

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 5th, at 5-30 P.M.

PRESENT

THE HON'BLE MR. JUSTICE N. G. A. EDGLEY, Member of Council, in the Chair.

Members :

Agharkar, Dr. S. P.
 Alimuddin, Mr. M. S.
 Bagchi, Dr. K. N.
 Chatterjee, Mr. B. C.
 Chatterji, Mrs. T.
 De, Mr. J. C.
 Driver, Mr. D. C.
 Fawcus, Mr. L. R.
 Gangoly, Mr. O. C.
 Ghose, Mr. S. C.

Gurner, Mr. C. W.
 Habibullah, Dr. A. B. M.
 Jenkins, Dr. W. A.
 Majumdar, Dr. R. C.
 Mukherjee, Dr. J. N.
 Nag, Dr. Kalidas
 Rahman, Mr. A. F. M. K.
 Rai-Chaudhuri, Dr. H. C.
 Tyson, Mr. G. W.

Visitors :

Bose, Mr. S. C.
 Chakravarty, Mr. A.
 Chatterji, Mr. S. R.
 Chaudhuri, Mr. R. P.
 Dodds, Prof. E. R. (from Oxford)
 Ghose, Mr. R. M.

Ghosh, Mr. Sisir
 Ghosh, Mr. Sudhir
 Gomes, Mr. P. J.
 Johnson, Mrs. T. E.
 Ray-Chaudhuri, Mr. G. C.
 Sircar, Dr. D. C.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of nine presentations of books, which had been placed on the table for inspection. They are:—

1. From the Editor: Kaulajana-nirnaya, ed. by P. C. Bagchi, Calcutta, 1934.
2. From the Editor: Upanisad-Vakya-Mahakosa, Vols. 1 and 2 (one vol.) by G. S. S. Sastri, Bombay, 1940.
3. From the Trustees of the E. G. W. Gibb Mem. Series: Tadhkirat al-Muluk by V. Minovsky, E. G. W. G. Ser. Vol. XVI, London, 1943.
4. From the Royal Society: Year Book of the Royal Society for 1943, London, 1943.
5. From R. C. Ghose: Partition of Bengal by C. C. Ghose, Calcutta, 1906.
6. From T. B. Cunha: Etnografia da India Portuguesa by A. B. de B. Pereira, Bastora, 1940. (2 vols.)
- 7-9. From Smithsonian Institution: Polynesians: Explorers of the Pacific by J. E. Weckler, Jr.; The Japanese by J. Embree; Siam: Land of Freeman by H. G. Deignan, Washington, 1943.

The General Secretary announced that the following candidates would be balloted for as Ordinary Members:—

(32) *Sinha, Ananda Prosad*, M.A. (Cal.), Ph.D. (Colorado), Organizing Secretary, Calcutta City Bank, Ltd., Lalitanilaya, Katwa P.O., Burdwan.

Proposer: K. Nag.

Seconder: R. C. Majumdar.

(33) *Rahman, B.*, Landowner, 26-D Marsden Street, Calcutta.

Proposer: M. S. Alimuddin.

Seconder: K. G. M. Farouqui.

(34) *Lawson, C. P.*, President, European Association; Imperial Chemical Industries, Ltd., 18 Strand Road, Calcutta.

Proposer: N. G. A. Edgley.

Seconder: K. Nag.

(35) *Rolles, Rev. Montague John*, Missionary, London Mission, Kamalapuram, Dt. Cuddappah, Madras Presy.

Proposer: F. H. Gravely.

Seconder: K. Nag.

(36) *Roy, Sudhindra Nath*, M.A., Landlord, 3 Tiloke Road, Ballygunge, Calcutta.

Proposer: O. C. Gangoly.

Seconder: K. Nag.

(37) *Gupta, H. C.*, I.C.S., Additional Land Acquisition Collector, 24-1 Ballygunge Circular Road, Calcutta.

Proposer: O. C. Gangoly.

Seconder: K. Nag.

The General Secretary reported the following loss of membership, since the previous meeting by resignation:

(2) R. Ghosh (An Ordinary Member, 1940).

The General Secretary reported that the election of

(3) K. M. Ray (elected on 1-3-1943)

had become null and void under Rule 9.

The General Secretary reported that

(1) Dr. B. N. Singh (elected 1-3-1943)

had withdrawn his application for membership.

The General Secretary reported that Mr. S. P. Mahajan who was removed from membership under the operation of Rules 37 and 38 had now regularized his position by paying all his dues, and he had now been made a member in accordance with Rule 39.

In accordance with Rule 48(a), the General Secretary reported that the Council since the last Ordinary Monthly Meeting, had made the following changes in the 'Regulations regarding the Election of Fellows':—

'For the duration of the war, in order to get the nomination and voting papers from abroad, that the meetings contemplated in Regulations Nos. 2 and 8 should be held in February instead of June, and within the fortnight preceding the 7th of August, instead of October respectively'.

The General Secretary also reported that during the last two years, owing to the war, the nomination papers were sent only to the Fellows residing in India, and the voting papers were issued to all the Fellows within the fortnight preceding the 7th of August, instead of the 7th of October.

The General Secretary reported the following loss of membership, since the previous meeting by death:

(6) T. B. Jameson (An Ordinary Member, 1926).

The Chairman called upon Mr. L. R. Fawcus to read an obituary notice of the late Mr. Jameson, M.C., I.C.S.

The Chairman called upon Dr. J. N. Mukherjée to read an obituary notice of the late Sir Bryce Burt, Kt., C.I.E., M.B.E., I.A.S. (retd.).

After the reading of the obituary notices, a vote of condolence was passed, all present standing.

The following paper was read:—

1. C. W. GURNER.—*Psychological Imagery in Kālidāsa.*

The author analyzes the use by Kālidāsa of a type of imagery more familiar in Sanskrit than in western poetry, namely, that illustrating scenes and activities in the material world from phases of consciousness, or one psychological experience from another. It is suggested that the underlying ground for the prominence of this type of simile lies in the introspectiveness of Sanskrit thought and literature and in the sense of the equivalence on the plane of reality, such as it may be, of the material world and personal consciousness. With a view to defining the subject for the western reader, the author quotes a rare instance of this type of simile in western literature, viz. Leigh Hunt's sonnet on the river Nile:—

'It flows through old hushed Egypt and its sand
Like some grave mighty thought threading a dream.'

Brief reference is then made to the use of the psychological simile in the Rāmāyana and in the works of Asvaghosha which are among the most important influences on Kālidāsa. The author then traces the use of this imagery from Kālidāsa, taking instances from (a) the simple consciousness of existence, (b) intellectual processes, such as education and memory, (c) the experience of volition (where the simile is largely due to verbal play on the word 'Manōratha'), (d) emotional experience, such as affection, and (e) moral conflict. Reference is made to the difficulty of finding a dividing-line between genuine similes from psychological experience and similes from the conventional fields of erotic ideas (Śṛṅgāra) as codified by Vātsāyana, or from conventional ideas associated with dharma and arthaśāstra. It is pointed out in conclusion that the range of conscious and subconscious experience is only one branch of the field of abstract ideas on which Kālidāsa draws for the ornament of simile in all its forms; and that this faculty of illustration from the abstract to the concrete is distinctive not of Kālidāsa as compared with other Sanskrit writers, but of Sanskrit literature as a whole compared with the western classics.

In the discussion that followed the reading of the paper, Prof. E. R. Dodds of the University of Oxford took part, who was introduced to the meeting by the General Secretary.

The adjourned symposium on the 'Early History of Bengal' was then continued, many members taking part in the discussion.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that all the candidates had been duly elected.



AUGUST

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 2nd, at 5-30 P.M.

PRESENT

DR. S. P. MOOKERJEE, M.A., B.L., LL.D., D.LITT., President, in the Chair.

Members :

Agharkar, Dr. S. P.
Akbar, Mr. M.
Chatterjee, Mr. B. C.
Chatterji, Dr. S. K.
Culshaw, Rev. W. J.
Dhiman, Mr. M. C.
Edgley, The Hon'ble Mr. Justice
N. G. A.

Griffiths, Dr. W. G.
Hendrie, Major J. H.
Hobbs, Major H.
Malik, Mr. A. R.
Majumdar, Dr. R. C.
Nag, Dr. Kalidas
Sukul, Mr. L.

Visitors :

Adhikary, Mr. J.
Ali, Mr. S. B.
Bhaduri, Mr. P.
Chakravarti, Mr. A. C.
Chatterjee, Mr. C.
Dutt, Mr. S. C.
Ganguly, Mr. B.
Ghosh, Mr. A. K.
Gomes, Mr. P. J.
Kamal-ud-Din, Mr. K.
Khan, Mr. A. W.

Khan, Mr. H. H.
Kundu, Dr. B. C.
Mitra, Mr. G.
Mukerji, Mr. D.
Nandi, Mr. P.
Pyne, Mr. S. K.
Ramachandran, Mr. T. N.
Sen-Gupta, Mr. J. C.
Shahidullah, Md.
Venkatram, Mr. M. S.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of the following ten presentations of books, which had been placed on the table for inspection:—

1. From General Printers and Publishers: History of Bengal, Hindu Period by R. C. Majumdar, Calcutta, 1943.
2. From B. C. Law: Vamsaththappakasini (Commentary on Mahavamsa) by G. P. Malalasekhara (2 vols.), London, 1935.
3. From Popular Book Depot: Life in the Gupta Age by R. N. Sastore, Bombay, 1943.

4. From Parsee Punchayat Funds: Oriental Treasures by J. C. Katrak, Bombay, 1941.

5-8. From Madras Govt.: Records of Fort St. George. Letters of Fort St. George, Vol. XL, Madras, 1942; do., 1943; Proceedings of the Mayor's Court, 1927, Vol. XLI, Madras, 1942; Letters to Fort St. George, 1761, Madras, 1942. (4 vols.)

9-10. From the Imperial Library: Author Catalogues of Printed Books in European Languages, Vols. III and IV, Calcutta, 1943.

The following candidates were balloted for as Ordinary Members:—

(38) *Bhattacharyya, Jogesh Chandra*, M.A., Lecturer in English, City College; 41 Deb Lane, P.O. Entally, Calcutta.

Proposer: Chintaharan Chakravarti.

Secunder: Durgacharan Chatterji.

(39) *Gurunath, Marti Mannariah*, M.A., Salt Merchant, 52 Brahmin Colony, Tuticorin, S. India.

Proposer: K. Nag.

Secunder: Durgacharan Chatterji.

(40) *Basu, Jogesh Chandra*, Vidyabinode, Government Pensioner and Landholder, 'Vasudham', P.O. Contai, Dt. Midnapur.

Proposer: K. Nag.

Secunder: Durgacharan Chatterji.

(41) *Ahuja, Yog Dhyani*, M.A., M.O.L., Hons. in Persian, Professor, Head of the Department of Persian and Urdu, Doaba College, Jullundur City, Punjab.

Proposer: Suniti Kumar Chatterji.

Secunder: O. C. Gangoli.

(42) *Gomes, Polycarp Joseph*, Secretary, European Group, Calcutta Corporation; 2-A Haralal Das Street, Calcutta.

Proposer: Sushil Chandra Ghosh.

Secunder: C. W. Gurner.

(43) *Ghose, Debes Chandra*, Merchant and Tea Estate Agent, P.O. Box No. 632; 'Mission Court', P. 12, Mission Row Extension, Calcutta.

Proposer: K. N. Bagchi.

Secunder: K. Nag.

The General Secretary reported the following loss of membership, since the previous meeting by death:—

(7) Sir Sydney Burrard (A Special Anniversary Member, 1934).

(8) Rev. William Pettigrew (An Associate Member, 1939).

The General Secretary reported the death of Sir Jehangir Coyajee, who was an Ordinary Member of the Society from 1925-34 and a Member of Council from 1929-32.

The Chairman proposed a vote of condolence on the death of these three distinguished men, which was adopted, all present standing.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The General Secretary reported that the election of

(4) M. G. Crofton (elected on 3-5-1943)

had become null and void, under Rule 9.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

In accordance with Rule 48(d), the General Secretary submitted for confirmation by the meeting the following appointments and changes made on the staff of the Society by the Council, since the last Ordinary Monthly Meeting:—

1. Mr. S. K. Saraswati, M.A., who has been working in the Society's Library temporarily since January 1943, has been appointed as Librarian of the Society on a salary of Rs.150—25—200 per month with effect from 1-8-1943; he is permitted to accept a salaried appointment in the Post-Graduate Department of the Calcutta University involving an absence of not more than three hours on two days each during the period when the University is in session. He shall not be permitted to take any other remunerative work.

2. Mr. B. C. Bose, M.A., who has been working as Library Assistant since January 1943 will continue in the Library for six months longer with effect from 1-8-1943 on his present salary of Rs.75 per month.

3. Mr. D. Burman, M.Com., who has been working in the Publication Department on a part-time basis of 3 hours a day on an emolument of Rs.100 per month will continue as such on the same terms.

4. Messrs. S. K. Ray and N. Gupta who were transferred to the Library in January 1943, have been re-transferred to the General Office, the former remaining as General Assistant and the latter a clerk in the Publication Department.

Order : Confirm.

The following papers were read:—

1. D. N. MAJUMDAR.—*Blood Groups of Tribes and Castes of the United Provinces with special reference to the Korwas.*

The main centres of tribal concentration in northern India are the Chotanagpur plateau with adjoining Indian States of Sarguja, Jashpur, Rewa and the Mirzapur district of the United Provinces, also Bundelkhand and Baghelkhand and the cis-Himalayan and submontane districts in the United Provinces.

There are four important tribal groups in the U.P. : (1) the Mirzapur tribes, (2) the tribes of the submontane districts, (3) the Khasas and other tribes of the cis-Himalayan region, and (4) the wandering and vagrant tribes.

So far, no data on the Blood Groups of the Mirzapur tribes who are believed to be racially akin to the Munda-speaking tribes of Chotanagpur and adjacent Indian States exist. The Korwas are the most primitive tribe in this area and their blood groups data are given for the first time by the author. It has been found that the Korwas are a more or less inbred group, faced with extinction. Their blood groups show a high A con-

centration which is highly significant. The paper is concluded with a discussion of their blood groups.

The paper is illustrated by plates and maps.

2. HARISH CHANDRA RAY.—*Report on a Collection of Molluscs from Santal Parganas, Bihar.*

In this paper, the author has made an endeavour to study and group the collection of molluscs obtained by Drs. H. S. Rao and H. A. Hafiz of the Zoological Survey of India from the District of Santal Parganas in Bihar. It has been found that it contains seventeen genera and twenty-seven species. The most interesting find is that of a young shell of land snail from the scrub jungle on the slope of Phuljori Hills, about 20 miles from Dumka in Deoghar Sub-Division. It is the type of the 'large depressed variety'.

The examination of the specimens has revealed certain interesting facts connected with the geographical distribution of a few species and varieties hitherto unknown from the area.

The author has grouped the species and varieties according to Kennard and Woodward, and Pilsbry and Bequaert.

3. B. C. KUNDU.—*Anatomy of Jute Stem with special reference to Cambial Activity and Distribution of Fibres in relation to Leaf-Trace System.*

In this paper, the author has described the anatomy of jute stem in different stages of development. In the young stem it has been found that the vascular tissues are not arranged in the form of discrete bundles, but they form a vascular ring from the beginning. The fibres which are all secondary in origin differentiate fully only in internodes which have ceased to grow in extension. Secondary phloem and secondary xylem are continually added on its two sides by the activity of the cambium. In the secondary phloem patches of fibres and soft phloem tissue are arranged alternately in radial seriation. The production of xylem is much greater than that of phloem.

Mucilage cells and canals are found to be abundantly present in the stem, in the pith and in the cortical tissues. Crystals of calcium oxalate occur widely in all the tissues except the xylem. Tannin in various forms is present in some varieties of *Corchorus capsularis*. The phyllotaxy is $\frac{2}{5}$, but may be $\frac{3}{8}$ in vigorously growing shoot. Each leaf usually has three bundles, which enter the stem as a trilacunar trace. An attempt has been made to work out the course of the trace bundles in the stem axis.

The distribution of the fibres in relation to the leaf-trace system has been worked out in detail. Fibres are absent in the bundles of the leaf; but as the bundles enter the stem axis,

fibres gradually differentiate in the traces at first towards the periphery of the trace and then centripetally towards the inner side. When the bundles properly take their position in the axis, cambial activity completely encloses the trace strands and new fibres continue to be formed on the outside.

In conclusion, the author has discussed the problems of fibre differentiation, and distribution of fibres in relation to leaf-trace system in the light of previous contributions on the subject and of his present study.

The paper is illustrated by plates and numerous figures.

The Chairman thanked Dr. W. G. Griffiths and Mr. D. Mukherji for taking the trouble of communicating the papers to the meeting.

Mr. T. N. Ramachandran, Superintendent, Archaeological Survey of India, then showed and explained the exhibits (plates, maps, etc.) of the recent archaeological findings at the ruins of Mainamati and Lalmai, near Comilla, Bengal.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that the candidates had been duly elected.

The Chairman announced, in conclusion, that, unless special notice was given, there would be no Ordinary Monthly meetings during the recess months, September and October and that the next meeting would be held on 1st November.



NOVEMBER

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 1st, at 5-30 P.M.

PRESENT

THE HON'BLE MR. JUSTICE N. G. A. EDGLEY, M.A., I.C.S.,
Barrister-at-Law, Member of Council, in the Chair.

Members:

Agharkar, Dr. S. P.
Basu, Mr. J. N.
Bhattacharjee, Mrs. S.
Das-Gupta, Dr. C. C.
Fawcus, Mr. L. R.
Ghuznavi, Mr. I. S. K.
Haq, Khan Sahib M. M.

Hobbs, Mr. H.
Hora, Dr. S. L.
Ishaque, Dr. M.
Nag, Dr. K.
Sen, Mr. S. C.
Vedantatirtha, Mr. N.
and others.

The minutes of the last meeting were read and confirmed,

The General Secretary reported receipt of the following 19 presentations of books, which had been kept on the table for inspection:—

1-2. From the Madras Govt.: Letters to Fort St. George, 1762—Records of Fort St. George, Vol. XLII, Madras, 1943; Public Department Sundry Book, 1759-1771; Vol. XII, Madras, 1942.

3. From the Department of Education, Baroda State: The Foundation of Mahratta Power in the South and Shahji's contribution to the establishment of the Mahratta Empire, Baroda, 1942.

4-5. From the Author: Manimekhalai in its historical setting by S. Krishnaswami Aiyangar, London, 1928; A History of Tirupati by S. Krishnaswami Aiyangar, Vol. 2, Tirumalai, Madras, 1941.

6. From the Prince of Wales Museum: Prince of Wales Museum, Western India, report for the year 1940-41, Bombay, 1942.

7. From R.A.S.B.: Maathir-ul-Umara, Vol. 1 by Beveridge and Prashad, Calcutta, 1941.

8-11. From the Smithsonian Inst.: Poisonous Reptiles of the World by Dr. M. Cochran, Washington, 1943; Egypt and the Suez Canal by Jr. F. H. H. Roberts, Washington, 1943; Are Wars Inevitable by J. R. Swanton, Washington, 1943; Native Peoples of New Guinea by M. W. Stirling, Washington, 1943.

12. From the Nagpur University: Astronomical Method and its application to the Chronology of Ancient India by K. L. Daftari, Nagpur, 1942.

13. From Tirumalai-Tirupati Devasthanam: History of Tirupati by S. K. Aiyangar, Vol. 1, Madras, 1940.

14. From Bombay Govt.: Daulat Rao Sindhia's Affairs, 1804-09 by N. B. Roy, Bombay, 1943.

15. From Maxwell Company: Oudh and the East India Company, 1785-1801 by P. Basu, Lucknow, 1943.

16. From Govt. of India: Ashtadasasahasrika Prajnaparamita and of an unidentified Text by Sten Konow, Delhi, 1942.

17. From Times of India: Has Congress Failed, by a Student of Public Affairs, Bombay, 1943.

18. From Govt. of India: The Manley Collection of Stone Age Tools, with topographical and other notes by A. Aiyappan and F. P. Manley, Delhi, 1942.

19. From the Author: Borobudur by Swami Sadananda, Calcutta, 1943.

The General Secretary reported that the following candidates had been elected Ordinary Members, during the recess months, September and October, under Rule 7:—

(44) *Rankin, Niall*, Lt.-Col., Scots Guards, Fellow, Royal Geographical Society, Member, Royal Central Asian Society; 15 Queens Park, Ballygunge, Calcutta.

Proposer: K. Nag.

Seconder: C. L. Jain.

(45) *Singh, Partap*, Merchant, Grosvenor House, Calcutta.

Proposer: A. F. M. Abdul Ali.

Seconder: P. J. Gomes.

(46) *Sahu, Lakshminarayan*, M.A., Member, Servant of India Society; Idigapadia, Cuttack.

Proposer: C. L. Jain.

Seconder: K. N. Bagchi.

(47) *Saran, Paramatma*, M.A. (Benares), Ph.D. (London), Lecturer in History, Benares Hindu University, Benares.

Proposer: Bains Prashad.

Secunder: B. S. Guha.

(48) *Clague, Peter*, Lieutenant, Royal Artillery; c/o Messrs. Lloyds Bank, Ltd., Karachi.

Proposer: K. Nag.

Secunder: R. C. Majumdar.

(49) *Mitter, Sushil Chandra*, M.A. (Cal.), D.Litt. (Paris), Writer and Research Scholar, 10/1A Maheschaudhuri Lane, Bhawanipore, Calcutta.

Proposer: K. Nag.

Secunder: R. C. Majumdar.

The General Secretary announced that the following candidates would be balloted for as Ordinary Members:—

(50) *Ghose, Gobinda Prosad*, M.A., B.L., Landholder, 43 Rashbehari Avenue, Calcutta.

Proposer: P. C. Gupta.

Secunder: K. Nag.

(51) *Halwasiya, P. D.*, Merchant, 47 Muktaram Babu Street, Calcutta.

Proposer: R. D. Chokhany.

Secunder: K. Nag.

(52) *Harlalka, B.*, M.A., Merchant, 75-G Paddapukur Road, Calcutta.

Proposer: R. D. Chokhany.

Secunder: K. Nag.

(53) *Gupta, Jyotish Chandra*, Professor of Pharmacology, School of Tropical Medicine, Calcutta.

Proposer: S. L. Hora.

Secunder: M. N. Saha.

The General Secretary reported the following loss of membership, since the previous meeting, by death:

(9) Rai Bahadur P. N. Mullick (An Ordinary Member, 1929).

(10) S. S. Huda (An Ordinary Member, 1940).

(11) K. C. De (A Life Member, 1895).

(12) Sir Aurel Stein (An Honorary Fellow, 1920).

The General Secretary reported the death of Lord Meston, an old member of the Society, from 1926–1931.

The General Secretary reported the death of Dr. C. G. Seligman who was the recipient of the Annandale Memorial Medal of the Society for Anthropology in 1930.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The General Secretary reported that there had been no lapses of election under Rule 9 or withdrawals of application, since the previous meeting.

In accordance with Rule 48(d) the General Secretary submitted for confirmation to the meeting the following appointments made on the staff of the Society, since the previous meeting:—

1. Mr. Sibsankar Mitra, M.A., as a cataloguer for the English section of the Society's Library provisionally on a salary of Rs.100 per month, subject to an average monthly output of 600 volumes; with effect from the 1st September.
2. Pandits Jagadish Bhattacharya and Ramdhan Bhattacharya and Nani Gopal Banerjee as cataloguers for the Sanskrit section of the Society's Library on a remuneration calculated at the rate of Rs.25 for every 100 MSS. catalogued by them, and the first two were confirmed in their appointments at the last Council meeting.

Order : Confirm.

The General Secretary reported that the Council had appointed the following to serve as members on the Advisory Boards of the following medals to be awarded at the Annual Meeting in February, 1944:—

(a) *Barclay Memorial Medal for Medicine or Biology.*

The *ex-officio* members (Biological and Medical Secretaries), Sir U. N. Brahmachari, Dr. S. L. Hora, Dr. S. C. Law, Dr. K. N. Bagchi and the General Secretary.

(b) *Sir William Jones Memorial Medal for Philosophy, Literature and History.*

The *ex-officio* members (Philological and Jt. Phil. Secretaries), Mr. C. W. Gurner, Dr. R. C. Majumdar, Dr. S. K. Chatterji, Prof. M. M. Haq, Dr. S. N. Das-Gupta and the General Secretary.

In accordance with Rule 48(a) the General Secretary reported for information that the Council at their September meeting permitted to have Library closed on Bank holidays during the past Pooja holidays. They permitted this as a special case in view of the abnormal circumstances prevailing in this city though it is in contravention of No. 11 of the 'Regulations regarding leave and late attendance in the office'.

The Chairman called upon Dr. Kalidas Nag to read an obituary notice written by Prof. J. C. Sinha of the Presidency College, of Sir J. C. Coyajee whose death was reported at the last meeting.

The Chairman called upon Dr. Kalidas Nag to read an obituary notice of Lord Meston, an old member of the Society from 1926 to 1931.

The Chairman called upon Dr. Kalidas Nag to read an obituary notice of the late Sir Aurel Stein.

After the reading of these obituary notices, a vote of condolence was passed, all present standing.

The following papers were read:—

1. K. BISWAS.—*Systematic Position of a Common Tree Fern of the Eastern Himalaya with a note on the genus Cyathea.*

Considerable confusion was discovered as regards the correct systematic position of many species of Indian and Burmese ferns and fern allies during the examination of type, co-type and duplicate sheets in Kew, British Museum (Natural History), London, Edinburgh and Calcutta Herbarium. It is high time that the correct determination of the species should be established.

In this paper, the author has dealt with one of the most common tree ferns of the Eastern Himalayas which has been considered by different well-known Pteridologists as three different species if not four. His study has revealed that there exists only one species, namely, *Cyathea spinulosa* Wall, and the rest are mere varieties or different forms which have developed under different ecological conditions. The confusion was evidently due to mainly herbarium work without much reference to the study of the plant in the field at different stages of its growth in different localities in India.

2. M. L. ROONWAL.—*Note on the colour of the iris, of the bare orbital skin around the eyes and of the edges of the eye-lids in the Indian Ring-Dove.*

In 1940 the author furnished the available data on the characteristics of the three subspecies of *Streptopelia decaocto*, namely, *S. d. decaocto* (Frivaldszky) (the Indian Ring-Dove), *S. d. stoliczkae* (Hume) (the Kashgar Ring-Dove), and *S. d. xanthocyclus* (Newman) (the Burmese Ring-Dove).

During a collecting tour in Rajputana in October-November 1941, Dr. B. N. Chopra and the author collected a few Ring-Doves which made it possible for him to observe the colour of the iris, of the bare orbital skin around the eyes and of the edges of the eye-lids in fresh specimens. The following observations were made on a fresh male of *S. d. decaocto* shot near R. Berach at Chittorgarh (Mewar State, Rajputana) on October 8, 1941.

Iris.—The iris was crimson-pink with a very thin outer black ring, the black ring not having been previously described in any of the subspecies.

Naked orbital skin around the eyes.—The colour of the naked orbital skin was *pale grey tinged, in irregular patches, with a distinct bright lemon-yellow*. Hitherto, the yellow tinge has not been recorded in *S. d. decaocto*, but has been considered as characteristic of *S. d. xanthocyclus*.

Edges of the eye-lids.—These were yellowish-white; hitherto only red edges have been recorded.

3. K. P. CHATTOPADHYAY.—*Two Indian Rafts*.

In this note the author describes two new types of rafts. One is a reed raft in use in Northern Bengal and the other is a gourd raft used on the upper reaches of the Jumna in the United Provinces. The paper is illustrated by a photograph of each type of rafts.

4. K. P. CHATTOPADHYAY.—*Bengal coiled Basketry*.

In this paper, the author has endeavoured to treat scientifically the technique of coiled basketry in Bengal. He has found it to be peculiar to Bengal, which is allied to carpentry, as opposed to sewing and weaving that are associated with the ordinary plaited basket-work. The method of pinning adjacent coils can be compared to the fitting together of planks in carvel-built boats. The paper is illustrated by sketches.

5. S. L. HORA and K. S. MISRA.—*On a small Collection of Fish from Iraq*.

A small collection of fish from the Persian Gulf and from the Hors and the rivers Shatt-al-Arab, Tigris and the Euphrates is dealt with. Of the supposed occurrence of about 50 species in these waters, specimens of only 13 were received from Mr. Dimitry D. Belayew, Specialist in Fisheries, Directorate General of Agriculture, Baghdad, Iraq. The material has enabled the authors to amplify the existing descriptions of as many as 9 species, and 2 have been found to be new to science. One of these is a mullet while the other is a kind of perch.

6. KNUT LINDBERG.—*Notes sur quelques Cystocercoïdes de Crustacés de l'Inde*.

7. KNUT LINDBERG.—*Cyclopoides (Crustacés Copépodes) de l'Inde II. Eucyclops gibsoni (Brady)*.

8. KNUT LINDBERG.—*Un nouveau Cyclopide de l'Inde Halicyclops electus, sp. nov.*

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that all candidates had been duly elected.

The Chairman announced that Discussion meetings would be resumed from Thursday, the 11th November, concerning which notices had already been issued to the members. He drew the attention of the members to these meetings and invited them to be present.

1. Thursday, 11th November, at 5-30 P.M.

Opener: Prof. Eric Dickinson, Punjab University, Lahore.
Subject: Graeco-Buddhist Sculptures.

2. Thursday, 18th November, at 5-30 P.M.

Opener: Dr. W. A. Jenkins, D.Sc., I.E.S., Director of Public Instruction, U.S. Club, Calcutta.
Subject: Educational Ideals, ancient and modern.



DECEMBER

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 6th, at 5-30 P.M.

PRESENT

M. Z. SIDDIQI, ESQ., M.A., PH.D., Joint Phil. Secretary
(in the Chair).

Members :

Bhattacharyya, Mr. J. C.	Khaitan, Mr. K. P.
Brown, Mr. Percy	Meyer, Miss S.
Edgley, The Hon'ble Mr. Justice	Mitra, Miss P.
N. G. A.	Nag, Dr. Kalidas
Haq, Khan Sahib M. M.	Rahman, Mr. S. K.
Hobbs, Mr. H.	Sukul, Prof. L.

Visitors :

Bhaduri, Mr. J. L.; Chakravarti, Mr. S.; and Ganguli, Mr. K. K.

At the outset, the Chairman announced that His Excellency the new Viceroy had been pleased to accept the Patronage of the Society.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of the following 15 presentations of books, which had been kept on the table for inspection:—

1. From the Author: Science, Cause and God by J. B. Freeman, Madras, 1943.
2. From Govt. of Burma: History of the Kachins of the Hukawng Valley by A. T. M. Kawlu Ma Nawng, Bombay, 1941.

3. From the Punjab University: *Fauna of Lahore* by Nazir Ahmad, Lahore, 1943.

4. From S. N. Dasgupta: *Govinda's Kadcha: A Black Forgery* by B. V. Dasgupta, Dacca, (n.d.).

5. From the Author: *Tribes in Ancient India* by B. C. Law, Poona, 1943.

6-11. From the Author: *The Growth of Responsibility in Sikhism* by Teja Singh, Lahore, 1942; *Asa Di Var or Guru Nanak's Ode* by Teja Singh, Amritsar, 1924; *Maharajah Ranjit Singh* by Teja Singh and Ganda Singh, Amritsar, 1939; *Sikhism* by Teja Singh, Calcutta, 1938; *The Psalm of Peace* by Teja Singh, Madras, 1938; *Banda Singh Bahadur* by Ganda Singh, Amritsar, 1935.

12. From Bh. Or. Res. Inst.: *Mahabharata, Sabhaparvan*, Fasc. 13, ed. by V. S. Sukthankar, Poona, 1943.

13. From University of Calcutta: *Sariraka-Mimamsa-Bhasya-Varttika* with Vivarna of B. Saraswat, ed. by A. Shastri and A. Bhattacharya, Pt. 1, Asutosh Ser. No. 1, Calcutta, 1942.

14-15. From the Author: *Jawahiru'l 'Ushshaq* by S. Ata Husain, Hyderabad, 1362 A.H.; *Maktubat Saiyyid Md. Husaini Gisudaraz* by S. Ata Husain, Hyderabad, 1362 A.H.

The General Secretary announced that the following candidates would be balloted for election as Ordinary Members:—

(54) *Haidar Khan, Ch. Ghulam*, M.A. (Arabic, Persian and Urdu), D.D., M.D.H., M.A.L.S. (Cairo), 'Mir Munshi', M.P.H.S. (Lahore), M.P.L.G., Lecturer in Persian and Arabic, Baring College; Anarkali, Batala, Punjab.

Proposer: Percy Brown.

Seconder: W. D. West.

(55) *Das, Jyotindra Nath*, Deputy Conservator of Forests, Sadiya, Assam.

Proposer: K. Nag.

Seconder: N. G. A. Edgley.

(56) *Stein, Walter Edward*, D.Sc., G.I.C.E., M.P.S., F.I.C.S., I.O.S., Assistant Civil Engineer Adviser, Directorate-General Munitions Production, 30 Park Street, Calcutta.

Proposer: Sir Cyril Fox.

Seconder: Percy Brown.

(57) *Johnson-Marshall, Percy Edwin Alan*, Dip Arch., A.R.I.B.A. Capt., R.E. Architect and Planner, c/o Messrs. Grindlay & Co., Ltd., 6 Church Lane, Calcutta.

Proposer: N. G. A. Edgley.

Seconder: Percy Brown.

(58) *Bonnerjee, Miss Sadhana*, Research Scholar, 66 Lansdowne Road, Calcutta.

Proposer: K. Nag.

Seconder: Percy Brown.

(59) *Blakie, Derek Edward Walter*, M.A., Army Officer, c/o The Imperial Bank of India, Bombay.

Proposer: Sir Cyril Fox.

Seconder: S. K. Rahman.

The General Secretary reported that there had been no loss of membership, since the last meeting, either by death or resignation.

The General Secretary reported that the election of

(5) B. Rahman (elected on 5-7-1943)

had become null and void under Rule 9.

The General Secretary reported that there had been no withdrawals of application, since the last meeting.

The General Secretary reported receipt of a gift to the Society from Dr. Bimala Churn Law, member of Council of 3½% Govt. Paper to the face value of Rs.8,000 for the institution of a gold medal to be named after him, and another gift of Rs.280 for meeting the cost of the first medal to be awarded at the Annual Meeting in February, 1944. He had also offered to bear the cost of preparing a die for the medal. These gifts had been accepted by the Council who had conveyed thanks to the donor.

The General Secretary reported that, in accordance with Rule 48(a), the Council had adopted a set of regulations regarding the award of the 'Bimala Churn Law Gold' Medal as follows:—

(1) The Gold Medal to the value of Rs.280 shall be awarded every year at the ordinary annual meeting of the Royal Asiatic Society of Bengal in February.

(2) The Medal shall be bestowed on a person who is considered to have made conspicuously important contributions to any one of the following subjects: (a) History, (b) Geography, (c) Philosophy, (d) Religions, (e) Ethnology, (f) Folklore, (g) Fine Arts and Architecture with special reference to India from the earliest time down to the thirteenth century A.D., and (h) Bengali language, literature and philology.

(3) The Council shall at a meeting in September appoint an Advisory Board consisting of not less than three members and the donor during his lifetime.

(4) The Advisory Board shall be termed 'The Bimala Churn Law Gold Medal Advisory Board' and shall include the Philological Secretary. The Board shall appoint a Chairman from amongst its members who shall have a casting vote (in addition to his own vote) in the event of the number of votes being equally divided.

(5) The General Secretary shall call a meeting of the Advisory Board in the first week of December every year, at the same time requesting the members to bring with them to the meeting the detailed statements of the work or attainments of such candidates as they may wish to propose. The General Secretary shall also place before the Board for consideration detailed statements of the work or attainments of any other candidate submitted by a Fellow of the Society. The Board after due consideration shall make the selection of a name to be submitted to the Council at its December meeting. The Council may for specified reasons request the Board to re-consider their decision but shall not be competent to substitute another name for the one already recommended by the Board.

(6) If in any year a deserving candidate is not available, the Board shall abstain from the selection of any name to be submitted to the Council and no medal shall be awarded for the year. But the interest on the Fund should continue to accumulate and should be utilized in a subsequent year in awarding two medals to two suitable candidates, if available.

(7) The name or names of the medallist or medallists shall be printed in the Calcutta Gazette as well as in the Society's Year-Book.

The General Secretary reported that, in accordance with Nos. 3 and 4 of the Regulations regarding the award of the

said medal, the Council had appointed an Advisory Board consisting of the following members:—

Dr. N. Dutt (Philological Secretary), *ex-officio*.

The President.

Dr. R. C. Majumdar and the Donor.

The Chairman announced that, in accordance with Rules 2c and 13, Council recommended for election as Associate Members of the Society of—

1. Basanta Ranjan Roy, and
2. Rev. F. A. Peter.

The Chairman called upon the General Secretary to state the grounds on which the recommendations had been made, and he stated as follows:—

‘Mr. Roy is one of our foremost scholars of early Bengali. He was for many years in charge of MS. Library of the Bangiya Sahitya Parishad, and subsequently he became Lecturer in the Dept. of Bengali in the University of Calcutta from which office he retired some years ago. Mr. Roy is well-known as the discoverer and editor of our oldest middle Bengali text, the Sri-Krisna-Kirttana of Bodu Chandidasa, a work comparable in linguistic and literary importance to the works of Chaucer in English, and his edition is one of the best examples of how an old text should be edited. Since his retirement from the University, Mr. Roy is continuing his interest in Early Bengali and allied studies, and is working at a Dictionary of Early Bengali. An Associate Membership of the Society will be a very great help for this fine old scholar who will appreciate very much the facilities to consult the Library.

Rev. F. A. Peter is not unknown to us—we published some time ago in our Journal an important paper by him on Tibetan Lamaistic Iconography. Mr. Peter is Swiss by nationality and is from Zurich, and formerly he was connected with the Moravian Mission in Ladakh, like the late Dr. Francke, the Tibetanist, so long associated with the Society. He is now in the Canadian Mission, and is posted at Palampore in Kangra district in the Punjab. Mr. Peter is a Tibetanist and besides is a very good artist, and if he can be associated with us, the Tibetan side of our research activities will be greatly strengthened.’

The General Secretary reported that, in accordance with Rule 48(a), the Council since the last Ordinary Monthly Meeting considered certain proposals regarding Discussion meetings contained in the note of the Hon'ble Mr. Justice N. G. A. Edgley, Chairman of the Programme Committee, dated 2-9-1943, based on the suggestions made in Sir Cyril Fox's letter, dated 29-8-1943, and had accepted the following proposals:—

1. That weekly Discussion meetings be held at 6-30 P.M., instead of fortnightly meetings at 5-30 P.M.

2. That if anybody wants tea, he should give two days' notice to the Superintendent.

3. That the military authorities will ordinarily be asked to provide two speakers every month, the other speakers being arranged as before by the Programme Committee.

4. That it must of course be understood that the subjects chosen for the meetings should not be such as are likely to involve any political or religious controversy.

5. That ordinarily the opener's speech should not exceed half an hour except in the case of subjects illustrated by lantern-slides when the duration should not ordinarily exceed 50 minutes.

6. That steps should be taken to give adequate publicity to this branch of the Society's work. Posters should be placed at the gate of the Society and at such other places as may be approved by the Programme Committee.

7. That the military authorities should again be informed that members of the Allied Forces stationed in and in the vicinity of Calcutta are welcome to make use of the Society's Library during the regular office hours.

8. That further lists of such members of the Society who will be prepared to meet the officers and men of the army be printed and circulated to the various units in Calcutta.

9. That a special effort should be made by the Programme Committee to secure speakers (both military and civilian) who will be able to speak on interesting and attractive subjects of general interest.

Order: Confirm.

The General Secretary reported that, in accordance with Rule 57(g), the Council since the last Ordinary Monthly Meeting had received from the National Institute of Sciences of India a report of the Proceedings of the Symposium on 'Post-war Organization of Scientific Research in India' held under the auspices of the Institute in Calcutta and considered certain resolutions adopted at the meeting with regard to the formation of a National Research Council in India which they had forwarded for opinion. The Council approved generally the resolutions of the symposium reading, as follows:—

I. The Council of the National Institute of Sciences of India be authorized to take necessary steps for the organization of a National Research Council constituted under the statutory authority of the Govt. of India. The National Research Council shall be directly responsible to the Government and have the following functions:—

- (a) To plan the main lines of scientific work in accordance with national needs, to formulate schemes for the above purposes, to review and modify the same whenever necessary and to recommend ways and means for implementing the results accomplished.
- (b) To ensure balanced development of all branches of Science, and minimize overlapping.
- (c) To advise and help relevant authorities regarding the training and supply of scientific personnel for pure and applied research.

CONSTITUTION.

National Research Council.

The National Research Council shall consist of scientific and technical experts not exceeding 60 in number, the majority of whom shall be

elected by non-official scientific organizations, including Universities and institutions of University rank, the remaining number being nominated by the Government of India from among the scientific and technical experts. The President of the National Research Council shall be nominated by the Government of India from among the members. A Vice-President shall be elected by the National Research Council from among its members. A whole-time salaried Secretary shall be appointed by the National Research Council for carrying on its work, who will be a member of the Council.

Governing Body of the National Research Council.

There shall be a Governing Body of the National Research Council which shall consist of the following:—

The President and Vice-President of the National Research Council, and the Chairman and Vice-Chairman of each of the Boards.

Boards of Research.

For the performance of its functions the National Research Council shall constitute the following Boards of Research from among its own members, each of which will be responsible, within its own particular sphere, for giving effect to the policy of the National Research Council:—

1. Board of Scientific Research,
2. Board of Agricultural Research (Soils, Crops and Animal Husbandry),
3. Board of Medical and Public Health Research,
4. Board of Engineering Research,

and such other Boards as may be considered to be necessary.

The maximum number of members of each of the Boards of Research shall be 50. The National Research Council shall appoint the Chairman and Vice-Chairman for each Board and shall co-opt eminent scientific workers in different branches in consultation with non-official scientific organizations, Universities and institutions of University rank, scientific departments of the Government and Federations of Chambers of Commerce.

Research Committees.

For the performance of its work, each Board will be authorized to constitute Research Committees for all important subjects, to settle the objectives of research, indicate the individuals or organizations which could undertake the several component parts of the enquiry, receive and co-ordinate the resulting information, make it available to those who will turn it to advantage and to form a national plan into which all those who are in a position to contribute information can fit the particular lines of research. Governing Bodies of National Research Laboratories, when established, shall be constituted in consultation with the relevant Research Committees.

II. The Government of India be requested to form development corporations for the performance of functions analogous to those performed by the Research Enterprises, Ltd. in Canada. The National Research Council shall be represented on the Governing Bodies of the development corporations.

III. To enable effect being given to the policy of scientific development determined by the National Research Council, the Government of India should make an annual grant of five crores of rupees per annum.

The General Secretary also reported that the Council had nominated Dr. S. P. Agharkar, Dr. M. N. Saha and Dr. R. C.

Majumdar to represent the Society at the next Symposium of the Institute which would be held in Delhi.

The General Secretary also reported that the Council had nominated Dr. R. C. Majumdar to represent the Society at the All-India Oriental Conference and the Indian History Congress which would be held at Benares Hindu University and at the Muslim University, Aligarh respectively, in December, 1943.

The Chairman called upon Dr. Kalidas Nag to read an obituary notice of the late Mr. K. C. De, C.I.E., I.C.S., written by Mr. L. R. Fawcus, C.I.E., I.C.S.

The following papers were read:—

1. MUKUNDAMURARI CHAKRAVARTY and AMIYA BHUSAN KAR.—*Observations on two Coccidia Eimeria trionyxae n.sp. and Eimeria triangularis n.sp., from the Intestine of the Turtle Trionyx gangeticus Cuv.*

The coccidian parasites described in this paper are supposed to be new to science as they do not resemble any known species of *Eimeria* so far discovered, and till now no other coccidian parasite has been reported to have been found in the turtle *Trionyx gangeticus*. The authors have named these two new parasites *Eimeria trionyxae* and *Eimeria triangularis* after the host and shape of the oocyst respectively. The paper is illustrated by text-figures, together with detailed descriptions and diagnoses of the two species.

2. JNANENDRA LAL BHADURI and KRISHNA CHANDRA GHOSE.—*Notes on the dorso-lumbar Veins in the common Indian Toad Bufo melanostictus Schneider.*

In this paper the authors have studied the numerical variation in the dorso-lumbar veins of the common Indian toad *Bufo melanostictus*. It is shown by statistical analysis that the range, two to three vessels, is the most commonly occurring feature. Further, a comparison of the dorso-lumbar veins of the described examples, belonging to the genera *Rana*, *Hyla* and *Xenopus*, with those of *Bufo* is made to indicate the lines of their apparent specialization. Evidence of the origin of numerical variability of the dorso-lumbar veins can be adduced from Gaupp's account of the development of the renal-portal system.

3. D. H. GORDON —*Hellenism in North-west India.*

In this paper, the author reopens the whole question of Indian Hellenism as well as of the specific contribution of the Greeks to Indian art. He closely examines the theory of W. W. Tarn in his book 'Greeks in Bactria and India'. He also points out that there is a strong similarity between terracottas of

hellenistic style found in Gandhara and those found in Selucia, and he comes to the conclusion that the hellenistic characteristics found on the Graeco-Buddhist art objects were not produced by any specially imported artists or craftsmen but were 'part of widespread art influences throughout the Middle East as the inevitable consequence of the hellenistic dynasties' set up as a result of Alexander's conquest. The paper compels a thorough revision in the matter of dating the Gandhara sculptures.

The following exhibit was shown and commented upon:—

1. MAHFUZ-UL HAQ.—*Fragment of the original illustrated Persian Translation of the Kathā Sarit Sāgara (or, The Ocean of the Streams of Story) made at the instance of the Emperor Akbar.*

Among the Sanskrit works translated at the instance of the Emperor Akbar was the famous *Kathā Sarit Sāgara*. Mullā 'Abd-ul Qādir Badāyūni, who was entrusted with the work in 1003/1595, gives certain details about the circumstances in which he undertook the translation, in his *Muntakhab-ut-Tawārīkh* (English Translation, vol. ii, pp. 415-16). A modern copy of the Persian translation, transcribed for Mr. Richard Johnson, is in the India Office Library (Ethé, No. 1987). Mr. A. C. Ardeshir of Poona has acquired 19 miniatures from the original Akbar manuscripts.

Photographs of the text and the paintings were exhibited.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that the candidates had been duly elected.

The Chairman drew attention of the members to the next Discussion meeting on Thursday, the 16th December, at 6-30 P.M. when Mr. M. A. F. Hirtzel, O.B.E., M.A. (Oxon), would speak on 'The River Systems of Bengal' and invited the members to attend it.

President and Fellows of Harvard College, Harvard University, Cambridge, Massachusetts, sent the following message on the occasion of the Society's 160th Jubilee :

The President and Fellows of Harvard College have learned with great pleasure of the celebration of the One Hundred and Sixtieth Anniversary of the founding of the Royal Asiatic Society of Bengal.

We wish to convey the congratulations of Harvard University on this important occasion, and we beg you to accept our best wishes that the future of the Society may equal its past in distinction.

(Received on May 11, 1944.)

OBITUARY NOTICES

. THE LATE MARI ALBERT JOHAN VAN MANEN.

Born: Nijmegen, Holland, 16th April, 1877.

As a youth he was not exactly a symbol of virtue.

On the contrary, he gave his parents and teachers a lot of trouble.

In their native town he and also his brothers had the reputation of giving vent profusely to their impulsive natures. Whatever about Van Manen's boyish ways and conduct, his mind was active enough. Instead of concentrating on school work, he often was found with the Koran, the Holy books of the Chinese and other reading of this kind.

As a youngster he already became the Editor of a philatelic Magazine. He also belonged to the regular visitors of the 'Haarlem Library'. The then Librarian, Mr. J. W. Enschede, influenced Van Manen's future life considerably.

Already in this period Van Manen was of the parties of young artists and thinkers of very advanced policy. Actually Van Manen, for the rest of his life, remained a Bohemian.

Later on we find him as a reporter connected with a well-known Daily in Holland. But soon he realizes his shortcomings. He left the newspaper's office and started reading very intensively Latin and Greek.

Then Theosophy, its principles and tenets, takes his fancy. He started a thorough study of this Dogma and soon was invited to translate into the Netherlands language Mrs. Blavatsky's famous book 'The Secret Doctrine'.

Van Manen found in the theosophical world a calling and a career. His linguistic talents paved the way for exploring folklore of ancient peoples.

Is it surprising that Van Manen was drawn to India, India, a fountain of mystic philosophy, ancient religions, wisdom and mysteries?

He arrived in the country of his fancy in February, 1899.

From 1909-1916 he was acting as second librarian and during the war as librarian of the Adyar Library, Madras (privately, not officially).

He lived in Ghoom (near Darjeeling) from the year 1916-1918 (2½) for the purpose of studying the Tibetan language.

In the year 1918 he was invited by the British-Indian Government to be one of the active members of the All-India Library Conference at Lahore,

During the years 1918-1921 he was invited by the British-Indian Government to accept the post of Librarian of the Imperial Library, Calcutta.

He accepted in the year 1922 an invitation, which made him an Assistant in charge of the Anthropological Section of the Indian Museum, Calcutta, for the purpose of re-arranging the Tibetan collections of 1923 up till date; became a member of the Senate of the Calcutta University.

He acted as General Secretary of the Asiatic Society of Bengal from 1923-1939, which Society, under his Secretaryship, received the Epithet Royal from the King of England after her 150 years' existence.

He was Editor of the year Issues of the Journal and Proceedings of the Royal Asiatic Society of Bengal from 1923-1939.

Was Editor of the Memoirs of Id from 1923-1939. In the same time-space acted as Editor of the *Bibliotheca Indica* (series of articles, written in Oriental languages: Sanskrit, Persian, Arabic, Tibetan, etc. etc.). In this time he was also Managing Secretary of the Indian Science Congress Association and Editor of their Proceedings.

He was working in the Censor-office of Calcutta from 1939 until the moment of his death.

C. E. VAN AKEN.

Read on 5-4-1943.

JOHAN VAN MANEN.

DISTINCTIONS:

Officer de la Couronne (Belgium), 1926.

Companion of the Indian Empire (Gr. Britain), 1930.

Officer de l'Instruction Publique (France), 1934.

Officer Orange Nassau (Netherlands), 1937.

My own testimony to his greatness of intellect must be brief. Better read than anyone in the antiquities of the country, he possessed a cheerful, facile humour, keen and refined, that informed the whole man.

It must be admitted that many of the papers read here are badly delivered and boring to the last degree, but, full of philosophical toleration he attached no importance to his own knowledge, for I never saw nor heard a trace of superiority or unkindness in his comments.

When he rose to sum up points discussed, his comments were as clear as crystal, as complete as a circle, and as amusing as a novel. There was nothing he did not adorn, and I regret not having preserved more vestiges of the grace of his conversation. He possessed little eccentricities of thought and tempera-

ment which seemed to separate him from the rest of the world and he will cling to the memory of members of this Society like a figure in a dream.

A lovable character, full of charity of heart and pocket, he was often preyed upon without that arousing resentment, and it might be said that he was

Magnificently unprepared
For the littleness of life.

H. HOBBS.

Read on 5-4-1943.

JOHAN VAN MANEN.

A Note.

Johan van Manen was, as everyone who knew him would agree, a most remarkable man: remarkable in many ways. Speaking for myself, I found him to be in several directions one of the best-read men I have met. Had he cared to set himself the task of contributing to some one branch of knowledge by means of an actual book, I believe he might have written a valuable treatise in the domain of Comparative Religion. He was well equipped for such a task, and certainly would have regarded it from an unusual angle. Most of those who have devoted thought to that subject would seem to have approached it from the anthropological standpoint. William James dealt with yet another aspect of it in his *Varieties of Religious Experience*. Van Manen, who was deeply versed in the literature of the subject, leaned, by reason of his own special 'make-up' to whatever emerged in the form of efflorescence of religious 'ideas'. By reason of that special make-up he would have produced something of originality in the field I allude to.

Most people who came across him in the course of his more recent employment will have been struck by his talents as a linguist. He was what I call a *natural* linguist. There are many linguists—professed linguists—some of distinction even, who had not anything like van Manen's natural talents.

Written by Col. Barwell.

A student of language he was; but those studies might have availed him little had he not possessed a quite extraordinary talent for interpreting the speech of Man. He read, wrote, and spoke with fluency several European languages besides his own mother tongue. In matter of pronunciation he fell short of what others attain whose ears are more attuned to musical sounds and who are thus more apt at mimicing their fellow

creatures. But the basic forms on which a language is built, its grammatical structure, the idiomatic phraseology which characterizes a language in the age of its advancement, presented no difficulties to him. He could read Latin well and had more than the average college student's knowledge of Greek. He was not wholly unacquainted with Russian. As to Oriental studies he was not and never pretended to be a Sanskritist in the accepted sense; but he knew the character and structure of that important language and to nearly the same extent the corresponding features of Tamil and of the kindred languages of South India. He was for more reasons than one drawn to the languages of China, and had some acquaintance with its more classical modes of expression. He would not, however, have for a moment pretended to scholarship in the Chinese sense of that word. But he loved what he had succeeded in extracting, albeit through the medium of translation, from Chinese literature; and he was particularly interested in the philosophy—if the expression be permitted—associated with the name of Lae Tze. Himself a keen and observant student of the ordinary man, van Manen combined a zest for cynicism when the same was clothed in the garments of wit and humour, with a profound capacity for affection strong enough to be described by the word love. In the records of Chinese thought throughout the long ages which have distinguished Chinese culture and civilization he found a very great deal which stimulated this dual reaction to manifestation of human sympathy and to the expression of human wit and wisdom.

It was, I think, this duality in his make-up which prevented van Manen from remaining an orthodox Christian. Before he reached middle life his appreciation of the mysterious forces which seem at once to surround and permeate mankind led him towards one of the most recent forms in which the religious sense had manifested itself—Theosophy. The cult had then but recently been much advertised by the notoriety which surrounded the late Madame Blavatsky and the late Colonel Olcott in respect of their claims to special forms of so-called 'occult' power. Van Manen, however, was led to make some study of Theosophy which was the same as then being expounded by Mrs. Annie Besant. Desiring greater practical acquaintance with its methods of approach to everyday problems, van Manen joined Mrs. Besant and her followers in their well-known settlement at Adyar near Madras. Amongst them van Manen lived for several years and may be said, incidentally, to have borne some part in the gradual evolution of the present offshoot from that school, associated with the name of Krishnamurti. Had he been minded, at the point of death, to make some confession of Faith he might have been heard to say, I think, that he regarded Krishnamurti as probably nearer than is any other living person to the ability for setting forth a system—not perhaps a philosophy—capable of guiding the ordinary man and

woman nearer than such persons have yet come to by other means towards ultimate spiritual truth.

In late years when his work had for long lain in other directions—namely, in more active work in the world than was possible for him at Adyar, and during the period when he had become most closely associated with the Asiatic Society of Bengal, he evinced a growing interest in Tibetan lore and language. I think, however, it was the Chinese influence on Tibet which had drawn him towards these later studies.

During the last ten years of his life van Manen came across an orphaned Chinese child, a boy who had passed his infancy on the fringe of Tibet—the Indo-Tibetan border. He seemed to find in this child many of those special qualities which from afar he himself had admired in the race from which the boy had sprung. Van Manen's capacity for understanding the human mind and heart soon enabled him to overcome those difficulties which to a man less endowed would have prevented the relations between these two developing into anything beyond the ordinary ties of master and servant. Van Manen, however, set himself to draw out every experience between infancy and the dawn of adolescence which this boy could recall and describe; and in the direction of psychological reactions as displayed in this child's life story van Manen believed himself to have obtained results which seemed to him of permanent value. The boy's slowly but carefully told narrative passed from one language into another and finally into English. It now covers several closely-typed volumes and is illustrated by the young man's own drawings. It is said that an American publisher had already promised to give it the light of day.

To sum up, van Manen was not what the ordinary academician calls a 'Scholar'. On the other hand he was beyond question a very learned man. His learning had come to him not from the School, but had been acquired in the business of feeding an abundant curiosity as to the nature of truth. To him the acquisition of knowledge in any form was of inestimable value; its advancement something of inescapable concern to us all. He was so modest as to claim for himself very little either in terms of acquisition or towards the common task of advancement for others. But those who really knew him may justly say that in both directions his personal labours achieved more than we shall ever be able to record. That modesty of which I speak has defeated us.

At the risk of writing something anti-climaxical I cannot withhold some expression of my regard for van Manen as a man. I knew him very intimately. Even the barest acquaintance could see how naturally friendly he was, and how much his approach to his everyday tasks was informed by a desire to help

others in need of that help. His private charities were ridiculously disproportionate to his means; and in cases of an appeal to the heart he was very frequently grossly deceived; but he was never consequentially embittered, for Pity was always at hand to play the advocate with him and to excuse the cheat. It was far less easy, however, to deceive him in other fields. He was not impressed by the naked insignia of academic success. He was quick to perceive the charlatan, however strongly such a one might have been recommended to his notice as a person otherwise distinguished, and he heartily despised those who used a university or a society such as ours less for the advance of learning than for the advancement of self. The fact that he made no secret of these sentiments brought him enemies. But his own capacity for friendship was such as gave him the means of an inward happiness which more than counterbalanced all this. I doubt, indeed, if anyone among us has more markedly deserved a corresponding loyalty from his friends.

Sd. NOEL BARWELL.

Read on 5-4-1943.

SIR NILRATAN SIRCAR (1861-1943).

Sir Nilratan's death at the age of 82, removes an outstanding figure in the medical and educational world and in the public life of India. He was the acknowledged leader of the medical profession in India for over half a century.

He was born in 1861 in a humble but respectable family at Netra near Diamond Harbour in the district of 24-Pargannas in Bengal. He had his school education at the Joynagar (24-Pargannas) H.E. School from where he was made to appear at the Entrance examination from the Preparatory class in 1876, in order to maintain the affiliation of the school to the University. In his school days, he was a resourceful, sprightly and brilliant child. His circumstances at the time did not permit him to secure higher University education and he was compelled to seek admission into the Campbell Medical, from where he passed out, after a brilliant career in 1880. It is said that he showed marked skill in mechanical engineering in his boyhood and everyone thought that he would choose an Engineering career in further education but the long-suffering disease to which his mother succumbed while he was about to appear at the Entrance examination led him to choose the medical career.

Not being satisfied with this performance, he passed the First Arts examination and graduated in 1884.

After a short interval during which he worked as the Head Master of a school, he entered the Calcutta Medical College in 1885 and passed out in 1888 with brilliant records. While in

the senior classes of the Medical College, his unquenchable thirst for knowledge led to the publication of an erudite paper on Infantile Biliary cirrhosis in the then best medical journal, the Indian Medical Gazette (1887). During 1888-1889, he acted as a House Surgeon of the Chandney and Mayo Hospitals. While engaged in such onerous duties, he could find time and energy to take the M.A. in 1889 and M.D. of the Calcutta University in 1890. Apart from his alertness of intelligence, he possessed a remarkably good memory.

He settled down in practice in 1890 and from then onwards he had a meteoric rise in the profession and public life of the country by dint of sheer merit, honesty of purpose and high character. He has had a rich and eventful life since then. He became a *Brahmo* in 1884 and married in 1888.

When he started the professional life, the European members of the Indian Medical Service led the profession, but in Sir Nilratan's life-time the initiative and leadership had already passed, chiefly through him, into Indian hands, and leading Indian doctors began to command higher fees than their European colleagues. He set high ethical standards in the practice of his profession which will serve as a beaconlight for the future generations. He was an efficient and popular teacher. Physiology and cardiology were two of his favourite subjects. He had a large library of medical and allied sciences and had an up-to-date electrical and recording machinery for the investigation of heart diseases.

He entered the Calcutta University as an elected Fellow in 1893, worked as its Vice-Chancellor from 1917-19 and was rewarded with a knighthood in 1917. He was the Dean of the Faculty of Medicine from 1939-41, of the Faculty of Science from 1933-39, President of the Council of Post-graduate Teaching in Arts from 1924-27 and in Science from 1924-42 and thus devoted his energies not only to the spread of medical education but also of general education. In 1920, he went as a delegate of the Calcutta University to the Empire Universities Congress at London and was honoured with the degree of D.C.L. of the University of Oxford and of LL.D. of the Edinburgh University. He took an active interest in the Student Welfare section of the Calcutta University. His own *alma mater* honoured him with the degree of D.Sc. in the year 1941. The University of Calcutta is to be congratulated in commemorating his memory by naming the University Chair of Zoology after him.

He strove hard for the development of scientific and industrial education in the country. His mature views on the subject are contained in his Convocation Address at the Andhra University delivered on the 7th October, 1939, shortly before his health began to decline. He expressed the view therein that a

national system of education should make use of three main methods, viz. the literary curriculum, the scientific curriculum and the technical curriculum and that each of these curricula should include the other two.

In other words, education should turn out the pupil with something he knew well and something he could do well. He expressed the view that research was the sap of the plant of science and that every teaching institution must encourage research work among its teachers and students.

This spirit of his has been perpetuated by his admirers and professional brethren by the establishment of a Research Institute named after him at the Carmichael Medical College in 1940. He was also associated with the late Sir Ashutosh Mookerjee in the establishment of the University College of Science, and of the National Council of Education and the College of Technology and Engineering at Jadabpur. He was also a Trustee of the Indian Museum for some time. In fact, he had helped with his advice and guidance every institution intended for the uplift of humanity.

He was one of the founders of the College of Physicians and Surgeons and later on the Carmichael Medical College, which is the first non-official University-grade Medical College in India. The affiliation of this College to the University of Calcutta was due no doubt to the quality of the staff and the equipment it possessed but also to the great influence which Sir Nilratan had with Lord Carmichael, the then Governor of Bengal, which was responsible for overcoming the opposition of the Indian Medical Service to the recognition of non-official medical colleges in India.

The following extract from the Centenary Volume of the Calcutta Medical College (1935) will furnish the story of non-official efforts to modernize western medical science in which Sir Nilratan Sircar took a prominent part:—

‘The publication of vernacular text-books and periodicals and the need for doctors in rural areas, and in tea gardens stimulated the beginning of several non-official medical schools in Calcutta about the year 1888-89. A vernacular medical school, called the Calcutta Medical School, was started about 1888-89 on the grounds now occupied by the Meohua Bazar Tram Depot. Shortly afterwards, an English section, called the College of Physicians and Surgeons of Bengal, was started on the grounds now occupied by the Brahmo Girls’ School. The vernacular School was transferred to Belgachia in 1903, a Hospital being attached to it, called the Albert Victor Hospital (1899-1902). About 1911, these two institutions were amalgamated and later on affiliated to the Calcutta University under the name of the Carmichael Medical College and Hospital (1915-16).’

When Sir Nilratan Sircar started his career, the modernization of the western medical science had just begun with the epoch-making discoveries of Pasteur, Lister and Koch. From then on up to the present day, enormous advances in every branch of the medical science have taken place. It is not a small achievement for a man to adjust his ideas to successive rapid advances in science in his own life-time and this Sir Nilratan carried to perfection. He was deeply read not only in the medical and allied sciences, but also in geology, literature, philosophy and religion.

He was opposed to the perpetuation of the Ayurvedic, Unani and Homeopathic systems as such, without the application of the basic sciences, as he pointed out that the basic sciences of chemistry, physics, biology, physiology, pharmacology, pathology and bacteriology were the same all over the world. He wanted to see one medical science which had been worked out by the scientists all over the world, incorporating however into it whatever good that might be proved correct in the indigenous medical sciences in the country.

He wanted to see a public health orientation to the present medical education and sociology being taught in theory and practice in the medical institutions. These, he thought, would supply a student with a proper outlook about his responsibilities to the community without which he was likely to be a misfit.

He was an exponent, along with many notable thinkers of his time, of the use of the mother tongue as the medium of instruction, in place of the English language.

He was very keen to see military training being given to University students as he thought that no autonomy or self-government could be real so long as the people concerned were not able to defend their country and their liberty against hostile assault and encroachment.

Sir Nilratan presided over the deliberations of the All-India Medical Conference once in 1918 and again in 1932. Until recently he was the Editor-in-Chief of the Journal of the Indian Medical Association and President of various hospitals, craft associations and academic bodies. His relations with professional brethren had always been most cordial and honourable.

He upheld all that was good and noble in the profession and in private life. Nobody had seen him lose his temper. His general temperament and readiness to place his services and erudition in the cause of all that is good and noble accounted for his wide popularity. Although a great physician, he was extraordinarily efficient in nursing and cooking, including invalid dietary.

Sir Nilratan was a great industrialist and encouraged, patronized and sponsored several industrial enterprises, such as tanning, soap-making, tea and pharmaceutical industry. In fact, he was one of the pioneers in the early industrialization of Bengal. He was not actuated by the profit motive in these ventures and had actually lost large sums of money at times in order to initiate his countrymen into industrial undertakings. His services to the distressed, the ailing and the suffering were not confined to the bedside but his sympathy extended to the dumb millions of the country.

His charities were manifold and the left hand did not know what the right hand gave. There are many scholars in India and abroad today who had received help from him for the prosecution of studies in India and abroad.

He was an ardent patriot and selfless nationalist. He never wanted to be in the limelight. He was a member of the old Bengal Legislative Council from 1912-1927.

His life was one of childlike simplicity, with varied interests which are not commonly met with. Very few people know that he was a good carpenter, a good designer, a good cook and a good nurse and that he took great delight in reciting the ancient folk-lore and folk songs of Bengal. His innate humility arose out of an ardent faith in living religion, which he practised. He believed in the Fatherhood of God and the Brotherhood of man. He presided at more than one religious conference. While presiding at the All-India Theistic Conference he declared: 'No form of religion has any life value today which fails to yield a living inspiration and social service, more especially the service of the lowly and the overburdened, the afflicted, the downcast, the oppressed and the fallen: and devotional religion in our Samajes, if it be not a more luxurious sensation, must go out among the depressed classes in living humility and patient life-giving service.' He himself lived this life. His richly strengthened religious life must have been the fountain-spring of his exceptionally composed nature, in presence of the difficulties and dangers with which he was confronted from time to time. Very few people know that he was deeply read in the religious philosophies and was well versed in Sanskrit literature. One can get a glimpse of his erudition from the first two pages of his Convocation Address at the Andhra University, delivered on the 7th October, 1939.

He has been a member of the Royal Asiatic Society of Bengal from 1924 till his death. It is in the fitness of things that the Society devotes its meeting on the 7th of June, 1943 (today) to condole the death of one of its distinguished and noble members.

A. C. UKIL.

Read on 7-6-1943.

SIR CHHAJURAM CHOWDHRY.

With the passing away of Sir Chhajuram Chowdhry on the 7th April, 1943, at his Calcutta residence, India has lost one of her great sons. Born in the year 1860 of poor Jat parents in a small village in the District of Hissar, Punjab, he rose by sheer force of his character, strict honesty, dogged perseverance and unflinching energy to be one of the commercial magnates of Calcutta.

After studying up to the Matriculation standard in the Government High School, Rewari, he came at an early age to Calcutta. He began his career as an ordinary clerk with Messrs. Hoare Miller & Co., Ltd. and after serving with them for two years he gave up the job and started business as a broker in the Hessian Market. The jute industry had just started. He was destined to take a big part in it. Having come in contact with the pioneers of the jute industry he soon built up his fortune. But every farthing of his earnings he spent to help his countrymen at the great famine of 1899-1900.

Fortune again favoured the noble heart and he flourished in business. Though he had many ups and downs in his life, his honesty of character always won for him influential friends like the late Sir David Yule. His worth was so highly appreciated in the business circle that he was taken on the Board of Directors of several Companies, both Indian and European, e.g. Belvedere Jute Mills Co. Ltd., Budge Budge Jute Mills Co. Ltd., Orient Jute Mills Co. Ltd., New Central Jute Mills Co. Ltd., Cheviot Mills Co. Ltd., Standard Jute Co. Ltd., Union Jute Co. Ltd., Bokaro & Ramgur Ltd., Birla Jute Mfg. Co. Ltd., Concord of India Insurance Co. Ltd., Mahabir Insurance Co. Ltd., Deoria Sugar Mills, Mohini Sugar Mills, Rawanwara Collieries, Eastern Syndicate Ltd., Shree Gopal Paper Mills Ltd., Unao Distilleries Ltd., Karam Chand Thapar & Bros. Ltd., Karam Chand Thapar & Sons Ltd., and Indian Steel & Wire Products, Ltd. He was one of those responsible for the inauguration of the Gunny Trades Association, of which he became President later, to look after the interests of the Indian Gunny Brokers and Merchants.

His chief claim to our remembrance, however, lies, not in Sir Chhajuram's wealth, but in the way in which he used that wealth. His catholic and generous heart made him open his purse strings to all communities, Hindu, Christian and Mahomedan alike. Arya Somaj institutions and Jat institutions all over India are indebted to him. The Schools and Hospitals he had started in the Punjab are other standing monuments of his generosity. He was made a C.I.E. in 1925 and knighted in 1931. No one who came in contact with him can ever forget his lovable personality. He was so simple and unostentatious that every one had easy access to him and to his

purse. His long life of 83 years was really a boon to his countrymen and his death is mourned by all.

S. C. LAW;

Read on 7-6-1943.

T. B. JAMESON.

By the death of Mr. T. B. Jameson, C.I.E., M.C., I.C.S., the Royal Asiatic Society of Bengal has lost a member who in addition to his personal interests in many branches of learning and science, had made his mark both as a judicial officer and an administrator of outstanding ability. As is well known to many of us in Bengal, he had to bear a large share of the responsibility for the administration of the district and subsequently the Division of Chittagong at a time when they were under apparently imminent threat of Japanese invasion, and the fact that he never spared himself in the arduous and responsible duties thus falling upon him may well have contributed to his fatal illness.

After serving throughout the last war in the British Army, during which period he was awarded the Military Cross, he joined the Indian Civil Service in 1921 and from then onwards till the time of his death filled a number of Executive and Judicial posts in Bengal; he became a member of our Society towards the end of 1926 and during the time when he was resident in Calcutta frequently attended its meetings, evincing keen interest in the discussions which took place.

During his periods of district work he developed interests in the countryside and village life of Bengal which combined with his marked literary bent might well have found expression in a lasting form had he been spared to enjoy the requisite leisure.

L. R. FAWCUS.

Read on 5-7-1943.

SIR BRYCE CUDLEIGH BURT, KT.

This meeting of the Royal Asiatic Society of Bengal records its deep sense of sorrow and loss at the death in England of Sir Bryce Burt, Vice-Chairman of the Imperial Council of Agricultural Research for many years, first president of the Indian Central Jute Committee and one associated with numerous learned societies and institutions.

The number of those who can claim the same share of credit of effective contribution to the development of Indian Agriculture as the late Sir Bryce Burt is very limited.

He graduated with first Honours from the University College, London, in 1901 and was for some time Assistant Lecturer in Chemistry of the Liverpool University. He was Assistant

Government Chemist and Lecturer of Tropical Agriculture, Trinidad, before coming to India in 1908 from which time till his retirement in 1939 he has served Indian Agriculture in numerous capacities. He filled successively the offices of Deputy Director of Agriculture, Cawnpore, from 1908-1921; first Secretary of the Indian Central Cotton Committee from 1921 to 1928; and Director of Agriculture in Bihar and Orissa from 1928 to 1929. So when the Imperial Council of Agricultural Research was created and started its most useful career he could bring to bear since its inception his ripe experience in the discharge of the duties of his new office of Agricultural Expert to the Imperial Council which he held from 1929 to 1935. Sir T. Vijayaraghavachariar, the first Vice-Chairman of the Imperial Council of Agricultural Research, and Sir Bryce C. Burt (then Mr. B. C. Burt) were mainly responsible for building up this important organization in its early stages. And when in 1935 he succeeded Sir Vijayaraghavachariar as Vice-Chairman of the Council he continued to direct its development and by the time he retired in 1939 the Council got itself established on its feet. As Vice-Chairman of the Imperial Council of Agricultural Research he was *ex-officio* chairman of several 'daughter' institutions, viz., the Indian Central Jute Committee, the Indian Central Cotton Committee, the Indian Lac Cess Committee and the Indian Coffee Cess Committee. He served all of them with great devotion, energy and distinction. Indian agricultural interests and agricultural research in particular had no doubt lost their great champion at the demise of Sir Bryce C. Burt.

The writer has personal reasons to remember him as a friend and comrade in science at whose request he took up his research work on soils and whose strong support and appreciation he gratefully remembers. The title given to this scheme of research, namely, colloid soil constituents was his own choice. He was ably supported in all his work by his wife Lady Burt whom most persons connected with Indian Agriculture will remember for her genial hospitality. After return from India Sir Bryce C. Burt took up active work in connection with the war effort relating to the food question in Great Britain. He had a genial personality and never hesitated to take up a definite attitude in what he considered to be proper. His loss will be mourned by a large circle of friends and admirers. He was a member of the Royal Asiatic Society of Bengal since 1943.

J. N. MUKHERJEE.

Read on 5-7-1943.

SIR JEHangIR COOVARJEE COYAJEE

(1875-1943)

With the passing away on July 14, 1943, of Sir Jehangir Coovarjee Coyajee, or, to give him his more familiar name, of

Prof. J. C. Coyajee, India has lost one of her foremost economists. Born on September 11, 1875, he received his early education at Rajkot and later on joined the Elphinstone College, Bombay. After taking his B.A. from the Bombay University, he taught for nearly a decade 'a variety of subjects—including such a diversified assortment as Economics, History and Persian—at different colleges of the Bombay Presidency'. He then proceeded to Cambridge, where with Keynes as his Tutor he secured a first in Economics Tripos in 1910. Next year on March 17, he joined the Presidency College (Calcutta) as the Professor of Economics.

With the organization of post-graduate teaching in the University of Calcutta, he actively participated in the work of the University Department of Economics also. This bald statement does less than justice to the tact, kindliness and sympathy of Prof. Coyajee, who had to work in double harness in the University and the Presidency College, whose respective functions were as yet vague and undefined. The times also were exceedingly difficult. There was a rousing of national consciousness. There was the storm and stress of the Great War. There was impatience and want of tact in many quarters, where better counsels should have prevailed. At this distance of time, it is possible to review all the unhappy events of the period dispassionately and one cannot withhold his tribute of admiration to Prof. Coyajee.

As the chief official expert on economic matters in those times, Prof. Coyajee was frequently consulted by the Bengal Government. Most of his 'notes' must be tucked away somewhere in the dusty shelves of the Bengal Secretariat. One of them however has been known. In 1918, the Government of Bengal appointed a Committee to enquire into the difficulties in connection with the circulation of one-rupee notes under the Chairmanship of Mr. J. A. L. Swan, the other members being Prof. Coyajee, the Hon'ble Raja Reshee Case Law, the Commissioner, Presidency Division, the Accountant-General, Bengal and the Postmaster-General, Bengal. This was the first of the series of Commissions and Committees served by Prof. Coyajee, the others being (a) Indian Fiscal Commission, 1921-22, (b) Royal Commission on Indian Currency and Finance, 1925-26 and (c) Indian Coal Committee, 1936-37. He was knighted in 1928. He served as a delegate to the League of Nations at Geneva for three years (1926-31).

During the last year of his service in the Presidency College, he was the Principal of the College, from October 30, 1930 to August 5, 1931. He then retired but not to rest. From 1932 to 1935, he was both Principal and Professor of Economics at Andhra University, where he also acted as the Vice-Chancellor for a time. As early as 1930, he had been nominated to the Council.

of State. He actively collaborated with the late Sir Sorabji Pochkhanwala, Managing Director of the Central Bank of India, Ltd. in organizing the Parsi Statistical Bureau for relieving unemployment among Parsis.

As correspondent for India of the Royal Economic Society of London for many years, Prof. Coyajee wrote extensively on economic subjects. But his interest in other subjects, although not so well known, deserves mention. He joined the Royal Asiatic Society of Bengal in 1925 and continued as a member until 1934. He also served on its Council from 1929 to 1932. He contributed as many as eight papers to the *Journal* from 1926 to 1930 (in Volumes XXII, XXIV and XXVI) and published the book *Cults and Legends of Ancient Iran and China*. In 1939 he was elected to the Government Research Fellowship of the K. R. Cama Oriental Institute and published under its auspices *Studies in the Shanamah*.

In 1916 appeared the *Bengal Economic Journal* under the joint editorship of Prof. Coyajee and Prof. C. J. Hamilton, then Minto Professor of Economics, Calcutta University. With the growth and development of economic studies and researches in different Universities in India, it was felt desirable to reconstitute the *Bengal Economic Association* (founded in 1916), the *Bengal Economic Conference* (first session on 3rd and 4th January, 1918), and the *Bengal Economic Journal* on an all-India basis, their places now being respectively taken up by the *Indian Economic Association* (founded in 1918), *Indian Economic Conference* (first session in December, 1917) and *Indian Journal of Economics* (started in 1916). But the pioneer efforts of Prof. Coyajee and his collaborators such as Prof. C. J. Hamilton cannot be overlooked. Prof. Coyajee contributed not only to the *Bengal Economic Journal* but also to *Indian Journal of Economics*, *Capital* (Calcutta), *Statesman* (Calcutta), *Presidency College Magazine* (Calcutta) and several journals on co-operation. Probably his earliest contribution on co-operation was the chapter on *Urban Banks in India* in *Indian Co-operation Studies*, a symposium edited by Mr. R. B. Ewbank. His work on the *Indian Fiscal Commission* (1921-22) mentioned above was responsible for his Presidential Address before the sixth session of the *Indian Economic Conference* at Lahore in January, 1923, on *Protectionism in India* and for his book on *Indian Fiscal Problem*, being a collection of seven lectures delivered at the Patna University as the Banaili Reader in Economics in August, 1923. Similarly after his work on the *Royal Commission on Indian Currency and Finance*, he delivered the Sir William Meyer Lectures for 1929 before the University of Madras, and published them as *The Indian Currency System 1835-1926*, affectionately dedicated to the memory of Alfred Marshall. This was quite in the fitness of things, not only because he had sat at the feet of

Marshall, but also because he had tried to apply the theories of International Trade taught by him in the Calcutta University to the problems of Indian currency and exchange. Again it was after his work at Geneva that he wrote his *India and the League of Nations*. It should also be noted that as a delegate from India he got the resolution passed recommending a study of the Economic Depression which resulted in Prof. Ohlin's *The Course and Phases of the World Economic Depression*.

Prof. Coyajee's strength in his economic writings lies in his absence of a partisan spirit and in his clear exposition of complicated and, at times, controversial issues. There are many Indians, who think that the policy of discriminating protection advocated by him does not go far enough, but there are none, who will not endorse Marshall's opinion on *Indian Fiscal Problem* as 'strong, well-balanced and suggestive'. It should be remembered that Prof. Coyajee was educated at Cambridge, where free trade was an article of faith, when the *End of Laissez-faire* was yet to come. In fact, during the earliest years of economic studies in India, there was undiluted Cambridge School of Economics, sponsored by Prof. Coyajee on the one hand and by Prof. Manohar Lal (now the Hon'ble Sir Manohar Lal), the first Minto Professor of Economics on the other. It is no wonder therefore that Prof. Coyajee must have felt very hesitant in advocating even a policy of discriminating protection.

Great as has been Prof. Coyajee's contribution to Indian economic literature, his influence was greater still through his students both in the Presidency College and in the Calcutta University and later on in the Andhra University,—for nearly a generation. It is a little difficult to define wherein lay his immense influence on his pupils. One must have heard him in order to appreciate it. His thoroughness, the extent of his knowledge and the serious manner in which he tackled his subject attracted enthusiasm and admiration from his class. He provided a syllabus containing headings and references, and tried to help his students as much as possible. What one appreciated most was his veneration for Marshall. His students were sometimes of a different opinion, who seemed to think that there were other points of view and Marshall's was certainly not the last word on any subject, yet Prof. Coyajee's admiration for his old teacher was so touching that his own students could not remain unaffected and had to love Prof. Coyajee in spite of what they thought was his blind adoration. To a long line of students among whom there are not only professional economists, but also many persons eminent in administrative services, whether executive or judicial, railway or financial, and in many other professions such as law or business, Prof. Coyajee will live long as the *doyen* among Indian economists.

J. C. SINHA.

Read on 1-11-1943

K. C. DE.

The death of Mr. K. C. De has deprived the Royal Asiatic Society of a member of very long standing, for he had become a life member as long ago as 1895. He was a man of broad cultural outlook and of very great administrative experience having held as a member of the Indian Civil Service a number of posts of importance under the Government of Bengal culminating in his tenure of the Membership of the Board of Revenue which he held with some intervals from 1923 till his retirement in 1928.

The writer of this obituary notice had the privilege of serving under him as Secretary to the Board of Revenue in 1927 and 1928, and can speak from experience of Mr. De's outstanding capacity for grasping a series of complicated facts and the care and patience which he displayed in unravelling intricacies and difficulties with a view to arriving at a right and equitable decision.

He was a very prominent Freemason—and towards the end of his life held one of the highest posts to which a Calcutta mason can aspire namely that of Assistant District Grand Master.

By his death the Society and indeed Bengal as a whole has sustained the loss of a man of great personality and distinction, and together with our sense of loss our deep sympathy naturally goes out to Mrs. De and the surviving members of his family.

L. R. FAWCUS.

Read on 6-12-1943.

COLONEL SIR SIDNEY BURRARD, Bart., K.C.S.I., F.R.S.,
Honorary Centenary Member of the Royal Asiatic
Society of Bengal.

It was my privilege to meet Lt.-Col. Sidney Gerald Burrard, Royal Engineers, in 1907 a few months before joining the Survey of India in which he was then Superintendent of the Trigonometrical Survey. His scientific prestige was by that time well established and he seemed to embody the high esteem in which the great Trigonometrical Survey of India was internationally held. His name seemed to follow naturally in the series, Lambton, Everest, Walker, Burrard, which covered more than a century of geodetic progress. This progress had not been one steady surge and one can recognize distinct salients. Lambton had initiated the Trigonometrical Survey in 1800. Starting from nothing—no equipment, no trained staff—he visualized and brought into being a network of triangulation covering Southern India. Following on this and with expanded ambitions, his successor Everest envisaged and duly completed the great arc of meridian from Cape Comorin to the Himalaya, and was

confronted with the task of determining the figure of the earth—then ill-assessed—as a primary necessity. To this day, the great Indian system of triangulation rests on Everest's figure. Extending from Everest's work, a grid-iron system of triangulation gradually covered the whole of India. Then came the great, business of adjusting this to one consistent whole on Everest's figure. With this phase one associates the name of J. T. Walker.

Along with the triangulation had gone astronomical determinations of latitude whose association with trigonometrically determined latitude should yield the curvature of meridian. The discrepancies were called 'deviations of the vertical' or 'deflections of the plumb line'. As more of these became known, greater became the embarrassment of those who tried to understand them. It is in this field that Burrard worked to such good purpose and found order out of chaos. He showed that the earlier compensation hypothesis of Pratt (Archdeacon of Calcutta in the mid nineteenth century) required a further hypothesis of grand-scale underground features and postulated a great 'Hidden Range' of high density traversing India from West to East. Burrard's work drew wide attention and it was later recognized by Hayford of the United States Coastal Geodetic Survey, who did so much to launch the modern theory of 'Isostasy', as an all-important link in the development. Isostasists today would do well to recall the Hidden Range of Burrard and not to make claims of isostasy beyond its powers of satisfaction.

I fancy that when Burrard joined the Survey of India in 1884, he must have found rather a state of geodetic stalemate in the Trigonometrical Branch. The great computational *tourde force* of simultaneous adjustment of the triangulation net-work had been the centre of interest and this had been recently completed with success. Those responsible may have felt disposed to rest on their oars and not to turn to the new vista along which geodesy was to make important developments. There was need of scientific initiation and this came with Burrard. Longitude arcs based on electric telegraph had been observed and results had been disappointing. It was perhaps for this reason—I do not know with certainty—that these results were not included in the simultaneous adjustment, a matter to be regretted. Burrard took part in some later longitude work and his interest naturally went to the bad closing errors of the arcs. Finally, he discovered the reason (dependent on the collimators)—and—here he was more fortunate than many who discovered mistakes in earlier work—he was able to indicate how the old observations could be correctly reduced. This indeed was done with great success—and the results then attained their proper significance. Burrard did not leave the matter there; at a later

period, he discussed all the longitude results and showed how to incorporate them into the main system of triangulation and thereby released a large amount of further data for 'Figure of the Earth' problems. He also with Lenox Conyngham, determined the fundamental longitude of India with reference to Greenwich.

Burrard was a delightful chief under whom to work. Some said that he was too much given to asking opinions from or consulting his juniors; but in scientific matters I cannot think that is wrong. It should stimulate the younger—and I am sure that Burrard was very stimulating in that way—and encourage the team spirit. I know of no case where Burrard was not very much looked up to and loved by those who worked with him on scientific problems. It was a matter of great regret to myself when his becoming the Surveyor-General of India in 1911 necessitated his departure from Dehra Dun. Of course, he retained his interests in geodesy and spent a few months in each year at Dehra Dun. At that time his interests in the formation of the Indo-Gangetic plain, as revealed by the geodetic deflections, was very great. He accepted the (then new) idea of Heyford's Isostasy and became involved in friendly controversy with Oldham of the Geological Survey. In 1916, he was President of the Indian Science Congress at Lucknow and the subject of his Presidential Address was 'The Plains of Northern India and their relationship to the Himalayan Mountains'. Burrard was a great Himalayan geographer and published in 1908 in collaboration with H. H. Hayden 'A Sketch of the Geography and Geology of the Himalaya Mountains and Tibet', a classical work which twenty-five years later he revised, this time in collaboration with A. M. Heron.

One result of the first World War was that Burrard's services as Surveyor-General were retained until 1919, several years after the normal time for his retirement. During his later days in India, he suffered very considerably from his eyesight and that trouble never left him. On retirement, he bought a house in Farnborough, Hants, and from that time he rather withdrew from scientific work, to the regret of his admirers. Nonetheless, he kept up correspondence with many of us and his letters were always a pleasure to receive. He always had a delightful sense of humour and a fund of interesting knowledge. He was something of an artist but very modest of this attainment. For his wife's artistic skill, he had profound admiration.

Burrard's geodetic work was recognized by election to the Fellowship of the Royal Society in 1904. In 1913 the Victoria Medal of the Royal Geographical Society was awarded to him for his distinguished contributions to geography and geodesy. In 1914, he became K.C.S.I., and in 1919 at the time of his retirement the Government of India expressed their 'appreciation

of the long and valuable service rendered by Col. Sir S. G. Burrard in the administration of the Survey of India and in maintaining the high traditions of the Department in the domain of scientific study; and also of the untiring and excellent work done by him for the armies in India and in the field during his tenure of the office of Surveyor-General'. In 1935, he was made a Special Honorary Centenary Member of the Royal Asiatic Society of Bengal. He succeeded a cousin as seventh Baronet in 1933. Born on the 12th of August 1860, he died on 16th of March 1943 in his 83rd year. His memory will long continue, particularly in the Survey of India, which he served so well.

J. DE GRAAF HUNTER.

Read on 3-1-1944.

SIR AUREL STEIN (1862-1943).

Hungarian by birth but of British domicile and citizenship Sir Aurel Stein served the cause of Geographical Exploration and Archaeology for nearly half a century. At the very beginning of his career in India and the Far East we find him connected with the Calcutta Madrasa as Principal (1899) and before that with the Punjab University and Oriental College, Lahore. From the Punjab he began paying visits to Kashmir and studying Sanskrit under the celebrated Kashmiri Pandit, Anand Kaul, to whom he paid a scholarly tribute. Already in 1892 we find him publishing the Sanskrit Text of Kalhana's *Rājatarāṅgiṇī* and the English translation thereof was completed by 1900. In 1894 he prepared a valuable catalogue of the Sanskrit manuscripts in the Raghunath Temple Library of Jammu. That was the time when the Asiatic Society of Bengal was preparing the edition and translation of the famous Bower Manuscript discovered by Captain Bower from Central Asia; and that might have given a definite turn to the archaeological activities of Stein. In 1898 he published a report of an archaeological tour with the Bonur field forces, Swat Valley. He opened the twentieth century with his Preliminary Report on a journey of archaeological and geographical explorations in Chinese Turkistan (1901). In 1903 he published the *Sand Buried Ruins of Khotan*, followed by two big volumes of *Ancient Khotan* (1907). In 1912 appeared his *Ruins of Desert Cathay*, followed by his monumental works entitled *Serindia* and the *Grotto of the Thousand Buddhas* (1921). In 1923 he published a Memoir on the Maps of Chinese Turkistan and between 1925 and 1928 he completed the *Innermost Asia* which, like *Serindia*, was richly illustrated with texts, maps and plates of rare paintings and sculptures discovered in the sandy desert of Central Asia. In 1933 he published a catalogue of Wall Paintings from Ancient

Shrines of Central Asia, but owing to unsettled conditions in China he was obliged to divert his attention to Iran and the intervening regions between India and Persia. In 1929 he published papers on Alexander's Track to the Indus, an archaeological tour in Waziristan and in Gedrosia. Between 1936 and 1940 he published his papers on his archaeological tours in Ancient Persia, North-Western India and South-Eastern Iran and discovered the old routes of Western Iran. In that connection he brought very valuable materials with regard to the prevalence of chalcolithic culture from the Indus Valley right up to Iran (3000-2000 B.C.). Geography was his speciality and through geography he entered the field of archaeology and through archaeology to fine arts. He added a new chapter, that of Serindia or cultural collaboration between China and India, in the study of Asiatic history and culture. Indian scholars will ever be grateful to Sir Aurel for his indefatigable researches in Central Asian history, which is now known to be so intimately connected with the expansion of Indian civilization through Central Asia to China and other nations of the Far East. In the very last days we find him in Afghanistan, probably travelling his way back to India when he suddenly died in Kabul, lamented by thousands of his admirers in India and abroad. He was elected a member of the Asiatic Society of Bengal in 1891 and subsequently nominated Honorary Fellow in 1920. As early as 1896 he published in our Journal his Notes on the Ancient Topography of the Pir Pansal Route, in 1898 his Notes on New Inscriptions discovered by Major Deane and in 1899 his Memoir on Maps illustrating the Ancient Geography of Kashmir.

KALIDAS NAG.

Read on 1-11-1943.

LORD MESTON (1865-1943).

James Scorgie Meston, born 12th June, 1865, in Aberdeen, completed his higher education in the University of Aberdeen and Balliol College, Oxford. He entered the Indian Civil Service at the age of 20 in 1885. In his official career we find him as Financial Secretary to the U.P. Government (1899-1903); Advisor to the Governments of Cape Colony and Transvaal on Civil Service Reform (1904-1906); Secretary to Finance Department, Government of India (1906-1912) and finally Governor of the United Provinces of Agra and Oudh (1912-1918). He represented India at the Imperial War Cabinet and Conference in 1917, and after retiring in 1919 served as Vice-Chairman of the Supervisory Commission, League of Nations. In 1920 he was appointed Rede Lecturer to the University of Cambridge. He was the Honorary Fellow of the University College, London

and an Honorary M.D. of Zurich University (1929). In 1928 his own University of Aberdeen elected him Chancellor and in 1932 he was President of the Royal Statistical Society. In 1931 he published a valuable book, *Nationhood for India*, and in the last days of his eventful life he was intimately connected with the Royal Institute of International Affairs, personally attending to its research department and to the review section of its valuable Journal.

KALIDAS NAG.

Read on 1-11-1943.

INSTRUCTIONS TO AUTHORS FOR THE SUBMISSION OF PAPERS FOR PUBLICATION IN THE JOURNAL AND MEMOIRS OF THE SOCIETY.

PAPERS

1. All communications submitted to the Society for publication should be addressed to the General Secretary and not to any officer by name. They should be type-written on one side of the paper with sufficient margin on the sides, and *in all respects must be absolutely in their final form for printing.*

2. Papers must be accompanied by a brief abstract not exceeding 1,000 words, which shall indicate the subject of the paper and the nature of the advance in the existing knowledge on the subject.

3. Tables of contents (for long papers), references to the plates and literature, etc., should be given in their proper places.

4. Quotations in Oriental languages should be in the original script, and wherever they are transliterated the System of Transliteration adopted by the Society must be followed (see instruction 15). The names of *genera* and *species* in the case of biological communications should be underlined to indicate that they are to be printed in italics.

ILLUSTRATIONS

5. All drawings and photographic prints should be as clear as possible. They should be in a form immediately suitable for reproduction, preferably of a size to permit reduction to about two-thirds the linear dimensions of the original, and should be capable of reproduction by photographic processes.

6. Drawings and diagrams to be reproduced as line blocks should be made with fixed Indian ink, preferably on fine white Bristol board, free from folds or creases; smooth clean lines or sharp dots, but no washes or colours should be employed for shading. The positions of the illustrations that are to appear in the text must be clearly indicated in the margin of the paper; and explanations of the figures should be typed at the end of the main paper with the indication: *Explanation of text-figures.*

7. The maximum space allowable for illustrations in the *Journal* and the *Memoirs* are as follows:—

Journal, text, 3½" × 6½", Plates 4½" × 7".

Memoirs, text, 6½" × 9"; Plates, 7½" × 9½".

These spaces include the usual figure numbering. Explanations of the plates to be printed on separate pages, facing the plates, must be typed on separate sheets.

PROOFS

8. A proof of each paper will be sent to the author, on the address given on the MS.

9. No alteration or addition necessitating any considerable change of type may be made in the proofs. Should such alterations or additions be necessary, these must be added as footnotes duly dated and initialled. The cost of corrections made in the proofs should not exceed 20% of the printers' charges for the setting of the paper; any excess will be charged to the authors.

10. The proof must, if possible, be returned within one week of the date of receipt of the Society duly corrected.

MISCELLANEOUS

11. Authors of papers published in the Society's *Journal* and *Memoirs* are entitled to receive *gratis* 30 copies of each paper, and as many more as they require on payment of the cost of printing, paper, and make up. Such requirements must be stated at the time of returning the proofs.

12. Papers by non-Members of the Society must be communicated through a Member, who shall satisfy himself that the paper is suitable for presentation to the Society, and is ready for the press.

13. No communications under consideration or accepted for the Society's publications may be published elsewhere without the express sanction of the Council.

14. To facilitate the compilation of indexes, each author is requested to return to the Society together with the proof, a brief index of the contents of the paper. These indexes will be edited and incorporated in the volume when completed.

15. The following systems of transliteration are henceforth to be followed (as far as practicable) in the publications of the Society, in quoting non-European words as such. In giving names of places, authors or books, which would occur in the course of the English text, a 'broad' transcription, following English values of the consonants and avoiding diacritical marks, is recommended.

SANSKRIT

अ = a	आ = ā	इ = i	ई = ī	उ = u	ऊ = ū
ए = e	ऐ = ē	ऋ = ṛ	ॠ = ṝ	ऌ = ḷ	ॡ = ḹ
ओ = o (or ō)	औ = au (or āu)	अक्षर = akṣara	अक्षर = akṣara	अक्षर = akṣara	अक्षर = akṣara
ऽ (Anusvāra) = ṁ	ः (Visarga) = ḥ	× (Jihvāmūliya) = ʃ	ॠ (Upadhmānīya) = φ		

Sandhi Vowels may be indicated as â î û ê ô. *Avagraha* = '.
Accents in Vedic—*Udatta* á â etc. *Svarita*—â.

क	ख	ग	घ	ङ	=	k	kh	g	gh	ṅ (or ṅ)
च	छ	ज	झ	ञ	=	c	ch	j	jh	ñ (or ṇ)
ट	ठ	ड	ढ	ण	=	ṭ	ṭh	ḍ	ḍh	ṇ
त	थ	द	ध	न	=	t	th	d	dh	n
प	फ	ब	भ	म	=	p	ph	b	bh	m
य	र	ल	व		=	y	r	l	v (or w)	
श	ष	स	ह		=	ś	ṣ	s	h	
ळ	ळ				=	ḷ	ḷh			

HINDI (and other North Indian Speeches)

As for Sanskrit, only nasalized Vowels are to be indicated by a tilde mark (˜) above the Vowel (e.g. अं अँ अ॑ = ā ā̃ ā̃̃, अ॒ = a ã ã̃).

etc.), and ढ ढ are to be denoted optionally by either d dh or by r rh. Care should be taken in distinguishing ब and व (b and v)—the latter preferably may be written as *w* rather than *v*, specially in intervocal and final positions. The final silent -a may be optionally omitted: but in quoting Early Hindi, etc. the final *a* should be retained. ठ ठ as in Rajasthani, Panjabi, etc. are to be indicated as in Vedic.

BENGALI

The system for Sanskrit, with the provision for nasal Vowels and for ড ঢ (= ড় ঢ়) as in Hindi. For য (অন্তঃস্থ য), in all *tatsama* or pure Sanskrit words, *y* should be employed, in Prakritic and semi-tatsama words, *j*; subscribed য (= য-ফলা) should be indicated by *y*. The difference between বর্ণীয় ব (= b) and অন্তঃস্থ ব (= v, w) need not be indicated for Bengali—*b* may be written for both: only subscribed ব (য-ফলা) is to be written as *w* (e.g. Skt. *Viśvāsa* = Bengali *Biśwās*). Final -a may be omitted optionally, but it should be retained for Early Bengali.

ARABIC

In transcribing Arabic, according to the context either (i) the native Arab pronunciation (as current in the *Jazīratu-l-‘Arab*) or (ii) the Perso-Indian pronunciation may be followed.

(i) Arabic in native Arab Pronunciation—

أ (alif hamza) = ’; ب = b, ت = t, ث = th (or θ); ج = j (or g), ح = h, خ = kh (or χ, or x); د = d, ذ = dh (or δ); ر = r, ز = z; س = s, ش = sh (or š); ص = s, ض = d; ط = t (or t), ظ = z (or z); ع = ’, غ = gh (or γ); ف = f, ق = q; ك = k; ل = l; م = m; ن = n; و = w, ū; ه = h; ي = y, i.

اَ اِ اُ respectively = a, i, u (or ə, ɪ optionally in place of i, u), آ = a, i, u; آ = ā; إ = i; و = ū; عى = ay (or ai); و = aw (or au); *tanwīn* = ^{un, an, in} above line; ى = á. (Note: عبد الحق = ‘Abdu-l-Haqq, or ‘Abd al-Haqq, not ‘Abd-ul-Haqq.)

ة = t (or h, or th).

(ii) Arabic in Perso-Indian Pronunciation, in the case of the following letters—

ث = ś, ذ = ź, ص ض = ʂ ʐ, ط ظ = ʈ ʑ.

PERSIAN

As for Arabic in Perso-Indian Pronunciation, with the following special Persian letters added:

پ = p, چ = ch (or c, or č), ژ = zh (or ž), گ = g.

و may be indicated for Persian by v rather than w.

For Early Modern Persian, and Indian pronunciation of Persian, the *majhūl* sounds of و and ۇ (= e, o) may be employed side by side with the *ma'rūf* sounds (= ī, ū).

و ى = au, ai. Nasalization (*nūn-i-ghunna*) may be indicated by *tilde* mark (˜) on the top of the Vowel, as in the case of Hindi, etc.

Hā-i-mukhtaḥfi can be represented optionally as *ah* or *a*.

The *Izāfat* is to be written as *-i-* (or *-e-* optionally).

URDU

As for Persian, only و = w, rather than v. See also the directions for Hindi. The special Urdu letters in the Perso-Arabic alphabet for Urdu are to be transcribed as in Hindi, e.g. ث = ʈ, ڌ = ɖ, ڑ = ɽ (or ɽ̌).

TAMIL

In transcribing Old Tamil, the modern pronunciation should not be followed—an exact transliteration will be enough for the purpose. This is in case of the consonants, which for Old Tamil should be indicated as below—

க = k (never g, even medially);	ங = ṅ (or ŋ)
ச = c (never ś, or j);	ஞ = ñ (or ɲ)
ட = ʈ (never ɖ, even medially);	ண = ɳ;
த = t (never d, or th);	ந = n;
ப = p (never b, or v);	ம = m;
ய ற ல் ள் = y, r, l, v; ன் = ɻ; ன் = n'; ற் = r' (ன்ற் = n'r',	
not ndr; ந்ந் = r'r', not tt); ழ = ʐ (or ʑ); ெ (āytam) = ɸ.	

Long ē and Long ō are to be distinguished from the corresponding short vowels by the *macron* or length mark—the short e and short o being left unmarked.

TIBETAN

Vowels—	a	i	u	e	o
Consonants—	k	kh	g	ṅ	(or ŋ)
	c	ch	j	ñ	(or ɲ)
	t	th	ḍ	n	
	p	ph	b	m	
	ts	tsh	dz	w	
	ž	z	'	(or ɦ)	
	y	r	l	š	s h

Silent letters need not be attempted to be indicated in transcription, but if necessary, the modern pronunciation may be denoted by some consistent system of phonetic transcription within brackets after the transliterated Tibetan (or *vice versa*).

CHINESE

Usually the North Mandarin Pronunciation should be represented, in Wade's system, with tones denoted by numerals. As far as necessary or practicable, the original Chinese character and the reconstructed pronunciation of it in Ancient Chinese should be given within brackets.

NOTICE

The Year-Book of the Royal Asiatic Society of Bengal is a continuation of the following four periodicals published by the Society :

Asiatic Researches, I-XX, 1788-1839.

Journal of the Asiatic Society of Bengal, I-LXXXIII, 1832-1904.

Proceedings of the Asiatic Society of Bengal, I-XL, 1865-1904.

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Single numbers are charged for at the rate of 8 annas for each 16 pages or part of 16 pages text, and for each plate, map, table, etc., not in the text. Postage extra.

Members of the Royal Asiatic Society of Bengal receive the current numbers of the Year-Book gratuitously, by virtue of their membership, and, if ordering back issues direct from the Society, have a right to a discount of 25% on their prices.

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The publications, information about them, and price lists giving details, are obtainable, on application, from the Society or its Agents.

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All previous prices as printed on the issues of the various "Journals" published by the Royal Asiatic Society of Bengal are cancelled.

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Orders for books should be accompanied by a full name and address, legibly written, and should be sent on a separate sheet of paper containing no other communication.

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